APPENDIX D WATER AND SEWER MATERIALS

City of Huntington Beach

Water Supply Assessment for Pacific City Development

Prepared for:

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Prepared by:

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May 30, 2003

Water Supply Assessment

City of Huntington Beach
for
Pacific City Development

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Water Supply Assessment

City of Huntington Beach
for
Pacific City Development

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Section 1 – Purpose of Report

Makar Properties, LLC is requesting that the City of Huntington Beach approve a new development, known as "Pacific City Development". The water purveyor for this proposed development is the City of Huntington Beach. This Water Supply Assessment is prepared in satisfaction of certain recently enacted requirements of the California Environmental Quality Act, the Water Supply Planning statutes (Water Code sections 10910 et seq.) and the Subdivision Map Act (Government Code section 66473.7), which require that a water provider furnish substantial evidence that adequate water supplies are available to meet the water demands of new and existing customers, through normal, single dry and multiple dry years for a 20 year period.

The City of Huntington Beach has prepared and adopted *2000 Urban Water Management Plan* (December 2000), which includes discussion and analysis of the City's water sources and supplies, planning for water reliability, its past, current and projected water use, water demand management measures, water shortage contingency plans, and water recycling. The City's *2000 Urban Water Management Plan* accounts for the water demand for the proposed Project.

Because the *2000 Urban Water Management Plan* accounts for the Project's water demand, the City hereby incorporates the information from the *Plan* in preparing this Water Supply Assessment.

In addition, this Water Supply Assessment reviews certain issues that have arisen since the preparation of the *2000 Urban Water Management Plan* regarding the reliability of the City's water supply.

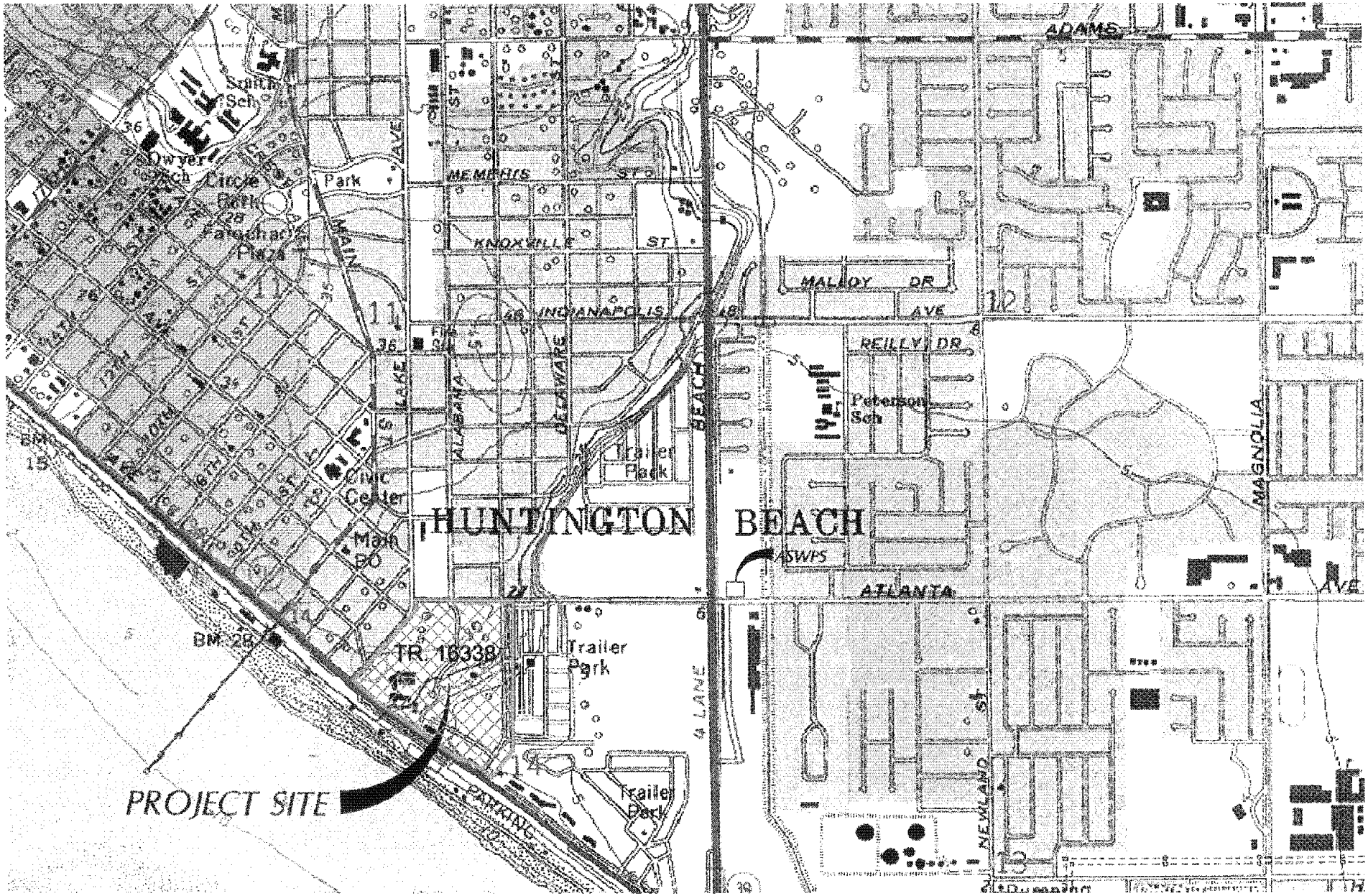
Section 2 – Proposed Project

The City of Huntington Beach is located in coastal Southern California, approximately 35 miles southeast of Los Angeles, in the County of Orange. The City is predominately residential with approximately 500 industrial businesses, 56 parks, and 8.5 miles of Pacific Ocean beach. It is within the South Coast Air Basin. The climate is generally described as Mediterranean, with 10-12 inches of annual precipitation. The City is essentially fully developed; the population within the City's water service area is expected to rise only about 2% over the next 20 years.

The proposed project is a mixed-use development for a 31-acre site in the City of Huntington Beach, located at the intersection of First Street and Pacific Coast Highway, bounded on the north by Atlanta Avenue, and on the east by Huntington Street. See site map following this page.[1]

The property is vacant land. Previous uses have included a mobile home park, a restaurant, a motel, and oil production. Those operations have been discontinued and the site has been undergoing remediation. The Makar development will create an additional demand upon the domestic water distribution system. Project engineering is performed by Hunsaker & Associates (H&A), which has estimated water demands based on design criteria of the City of Huntington Beach.

[1]Source: Hunsaker & Associates Irvine, Inc.



NORTH

NOT TO SCALE

PACIFIC CITY
PROJECT LOCATION

EXHIBIT # 1

PREPARED BY:

HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

DATE: 11/27/02
W.O. 2198-13X
O:\Huntington Beach\Pacific City\Exhibit\SDS-Project-Loc.DWG

Section 3 – Estimated Water Demand for the Project

The water demand for the proposed project was taken into account in the City's 2000 Urban Water Management Plan. The 2000 Urban Water Management Plan was based upon the City's General Plan and zoning for the site, and included a demand projection consistent with land uses allowed under the City's General Plan.

The estimated water demands for the proposed project are based on the City of Huntington Beach's design criteria in accordance with the project concept. Tables 1 and 2 break down water usage by demand factors and land use.

Table 1

Water Demand Type

Demand Classification	Million Gallons Per Day	Gallons Per Minute
Average Day	0.42	292
Maximum Day	0.67	467
Peak Hour	1.05	730
Maximum Fire Flow	5.755	4,000

Table 2

Water Demands by Land Use

Land Use	Quantity	Duty Factor	Flow
Condominiums	540 DUs	400. gpd/DU	216,000
Hotel	400 Rooms	225. gpd/Room	90,000
Office	60,000 Square Ft.	0.3 gpd/Square Ft.	18,000
Rest./Brewery	50,000 Square Ft.	1.5 gpd/Square Ft.	75,000
Retail	130,000 Sq. Ft.	0.15 gpd/Square Ft.	19,500
Total			**418,500 gpd**
Total			**0.42 mgd**
Max Daily Flow			**0.67 mgd**
Peak Hour Flow			**1.05 mgd**

Water Demand Factors

Condominiums: 180 gallons per day x 2.2 people per Dwelling Unit = 400 gpd/DU
Hotel: 150 gpd/room x 1.5 = 225 gpd/DU
Office: 300 gpd/1,000 SF = 0.3 gpd/SF
Restaurant/Brewery: 1.5 gpd/SF
Retail: 0.15 gpd/SF

Section 4 – Water Supply, Water Demand, Populations[2]

Table 3

Water Supply and Demand
(Acre Feet)

Year	2000	2005	2010	2015	2020	2022
Supply	37,460	38,200	40,075	40,100	40,100	40,100
Demand	34,600	35,526	37,270	37,330	37,330	37,330
Difference	2,860	2,674	2,805	2,770	2,770	2,770

Table 4

Water Supply[3]
(Acre Feet)

Year	2000	2005	2010	2015	2020	2022
Imported	9,365	9,550	10,000	10,000	10,000	10,000
Ground	28,095	28,250	29,675	29,700	29,700	29,700
Reclaimed	0	400	400	400	400	400
Total	37,460	38,200	40,075	40,100	40,100	40,100

Table 5

City's Service Area Population Projections[4]

2000	2005	2010	2015	2020	2022
206,292	209,203	210,612*	210,021*	210,053 *	210,100 *

* Decrease in population due to normal aging of population in a community that is fully developed.

[2]City of Huntington Beach, *2000 Urban Water Management Plan* (December 2000).

[3]Ibid.

[4]The Center for Demographic Research, California State University, Fullerton.

A. Delivery

Bulk water supply will be delivered through the City's backbone water supply system. Some off-site pipeline construction will be needed to eliminate some existing, community-wide water distribution system deficiencies. Upon completion of the off-site improvements, water will be delivered to the project through the City's improved domestic water distribution system. The off-site domestic water system includes the following:

1. Water availability from the north through a 20-inch pipeline in Lake Street, with a connection to serve the project site through an existing 18-inch pipeline on the project site. The 18-inch water main is part of the system to serve the Hilton Hotel and the Water Front developments, east of the Pacific City project.

2. Water supply from the west via a 12-inch pipeline continued in First Avenue to Pacific Coast Highway (PCH).

3. Additional supply from the north through a 12-inch pipeline in Atlanta Avenue.

4. Water supply from the south and east through a 12-inch water main in PCH.

5. The City of Huntington Beach is currently constructing an extension of the 18-inch pipeline to connect to a new 12-inch main in Beach Boulevard.

The City's Public Works Department contracted with Tetra Tech., Inc. to perform a computer model hydraulic analysis of water service to the Pacific City project site and the surrounding area based on City planning data, and data provided by Maker Properties. The analysis noted various water distribution system deficiencies resulting from the proposed project, that will require mitigation (in the form of infrastructure improvements), to meet the demands of, and for the benefit of the proposed project and the surrounding area. The proposed improvements are shown on the map in the appendix.[5]

Following is a listing of the proposed improvements.

A. A new 18-inch water main on Pacific View Avenue between First Street and Huntington Street.

B. A new 12-inch water main in Huntington Street that will connect to an existing 12-inch water main in Atlanta Avenue and with an existing water main in Huntington Street as well as to the new 18-inch water main in Pacific View Avenue.

C. A new 12-inch water main in First Street (in the public right-of-way) that will connect to the existing 12-inch water main in Atlanta Avenue and with the new 18-inch water main in Pacific View Avenue.

D. A new 12-inch water main in First Street that will connect to a new 12-inch water main in Pacific Coast Highway and with the new 18-inch water main in Pacific View Avenue.

[5]Source: Hunsaker & Associates Irvine, Inc.

E. A new 12-inch water main in Pacific Coast Highway that will connect with the new 12-inch water main in First Street and with an existing 12-inch water main in Huntington Street.

F. The proposed 12-inch water main in Huntington Street should be constructed and put into service prior to taking the 18-inch water main out of service.

Upon completion of the proposed improvements, the City's distribution system will be improved beyond present capabilities.

B. Supply

Table 6
The City of Huntington Beach's Total Water Supply
(Acre Feet)

Year	2000	2005	2010	2015	2020	2022
MWDOC Imported	**9,365**	**9,550**	**10,000**	**10,000**	**10,000**	**10,000**
Groundwater Production	**28,095**	**28,250**	**29,675**	**29,700**	**29,700**	**29,700**
Recycled Water	**0**	**400**	**400**	**400**	**400**	**400**
Total	**37,460**	**38,200**	**40,075**	**40,100**	**40,100**	**40,100**

The data in Table 6 represents a breakdown of the City's total water supply. Quantities are shown in acre feet.

1. Groundwater Supply

As shown in Table 6, the primary water source for the City of Huntington Beach's municipal water supply is groundwater produced from the City's wells in the Santa Ana River Groundwater Basin.[6] The City obtains about 75% of its water from groundwater production, and expects to do so for the foreseeable future. This year, however, the City will be able to draw only about 66% of its water from

[6] A detailed description of the Santa Ana River Groundwater Basin, including its hydrology, is found in Chapter 3, Master Plan Report, Orange County Water District (April 1999), at pp. 3-1 through 3-14. A description of the recharge facilities used by the groundwater management agency, the Orange County Water District, to replenish the groundwater basin, is also found throughout the Master Plan Report, Orange County Water District. See, for example, Chapter 4, at pages 4-1 through 4-36. The groundwater resources relied on by the city were also described in figures at Page 2-2. "Historic & Projected District Total Water Demands;" Page 3-11. "Available Basin Storage since 1969;" following Page 5-3, "Historic Santa Ana River flows and Wastewater Discharges;" Page 6-4, "Historical Supply Production in the MWD Service Area by Type of Supply; Page 6-5, "Regional Retail Water Demand in MWD;" and Page 6-3, "MWD Total Water Deliveries;" all found in *Master Plan Report* for the Orange County Water District (April 1999).

the Basin, due to the impacts of a long-term drought that has depleted the Basin. The City will need to make up the difference with increased imported water. Fortunately, however, Metropolitan has so much water this year that it has terminated its arrangements to purchase and import water from other counties.

To review, in brief, the information contained in the *2000 Urban Water Management Plan*, the basin underlies the north half of Orange County. It covers an area of approximately 350 square miles and extend over 2,000 feet deep. Total groundwater production from the Basin has increased steadily over the last several years, from about 300,000 acre-feet in 1990, to over 350,000 feet now. By 2020, the Basin could produce 490,000 acre-feet per year, if certain capital improvements to the Basin are made.

The groundwater produced by the City of Huntington Beach includes replenishment water imported into the region by Metropolitan Water District of Southern California (discussed in Section 4(B)(2)) and discharged recycled water from wastewater discharged to the Santa Ana River by upstream dischargers.

The City of Huntington Beach is one of a number of producers in the Santa Ana River groundwater basin, and has been fully annexed to the special district which manages the groundwater basin, the Orange County Water District. The basin has been managed since 1933 by the Orange County Water District, a special district organized under a special act of the legislature, Water Code Appendix 40.

Although the pumping rights of the producers within the basin have not been quantified through the process of basin adjudication, they exist and have not been abrogated by the Act (Water Code Appendix section 40-77). The City of Huntington Beach's rights consist of municipal appropriator's rights. The Orange County Water District's management of the groundwater basin under the Act serves to enforce a statutorily-imposed physical solution involving the restriction on the exportation of pumped groundwater from the basin, and the controlled overdraft and planned replenishment of the basin.

The Act empowers the Orange County Water District to impose pump taxes and basin equity assessments on production, registration of wells, and the filing of reports of pumping. On behalf of all of the pumpers, the Orange County Water District acquires and operates groundwater replenishment facilities, operates salt water barriers which particularly benefit the City of Huntington Beach and plans for the future of the District.

The Orange County Water District carefully monitors the groundwater elevations of the basin, and annually projects both basin demands, and basin supplies and publishes its study in an annual engineer's report. Based upon the engineer's report, the Board of Directors determines whether to purchase additional water supplies for percolation into the basin, and what management practices to follow. The basin is managed through a carefully monitored system of controlled overdraft. A description of the management options available to the District, and its historic management practices, is set forth more fully in the Master Plan Report for the Orange County Water District (April 1999). In summary, the District recently has maintained the Basin in slight overdraft, to increase the Basin's capacity for recharge.

The Orange County Water District is expressly prohibited from limiting a municipal appropriator's extractions unless it agrees, and it is required to annually investigate the condition of the Basin, assess overdraft and accumulated overdraft and determine the quantity of water necessary for basin replenishment (Water Code Appendix section 40-26).

The Orange County Water District has studied the basin replenishment needs and potential projects to address growth in demand through 2020. The study and analysis are described in detail in its *Master Plan Report for the Orange County Water District* (April 1999). Records of ground water production are available both at the City of Huntington Beach, and at the Orange County Water District.

In summary, the *Master Plan Report* concludes that Orange County Water District can generally maintain its same level of service well into the future. The District will need approximately $212 million to fund capital improvement projects necessary to maintain this level of service while meeting the increased demand. The District has the financial capability to issue the additional long-term debt to fund the future projects that will allow the continuance of its historical level of service. The District charged a replenishment assessment of $94 per acre-foot in 1999. Each $10 increase in the replenishment assessment increases a water consumer's monthly water bill by $0.31. The District forecasts that its replenishment assessment will increase to $192 per acre-foot by the year 2020, or approximately $3 per month for each water consumer.

The City believes that a $3 per month increase in its residents' monthly water bills over the next 20 years, to ensure the continued availability of groundwater from the Orange County Water District, is reasonable. The minimal amount of the increase in monthly water bills, coupled with the District's excellent financial position and the District's demonstrated leadership in continuing to manage the Basin, support the issuance of this water supply assessment.

For further information, please see Section 2 of the City of Huntington Beach's *2000 Urban Water Management Plan* for a description of groundwater management and availability. The section also contains data about the City's wells.

2. Imported Water Supply

The City of Huntington Beach's groundwater supply is supplemented with water purchased from the Municipal Water District of Orange County, a member agency of the Metropolitan Water District of Southern California. As a member agency, the Municipal Water District is entitled to purchase water from Metropolitan, as available. Metropolitan has contracts for the delivery, storage and exchange of water, which are discussed more fully in *The Regional Urban Water Management Plan for the Metropolitan Water District of Southern California,* (December 2000) published by Metropolitan Water District of Southern California, and *Report on Metropolitan's Water Supplies,* published by Metropolitan Water District of Southern California (March 25, 2003). The water is imported from two major watersheds: the Sierras, and the Rockies. Thus the City of Huntington Beach uses groundwater conjunctively with its purchased surface water supplies.

Metropolitan's most recent analysis is very conservative. For example, Metropolitan's own regional water demand projections are 6% to 16% higher than the aggregated projections of Metropolitan's member agencies. This difference provides a measure of margin of safety or flexibility to accommodate some delays in local resources development or adjustments in development plans.

Metropolitan has found that it has a comprehensive supply plan to provide sufficient supplemental water supplies and to provide a prudent supply reserve over the next 20 years. This projection was made in light of the loss of a substantial amount of Colorado River water. Even though (at the time that Metropolitan prepared the report) California had lost access to more than 35% of its expected

Colorado River supply, due both to the failure of multi-party negotiations over rights to Colorado River water and to record drought conditions, Metropolitan can continue to deliver an adequate supply of water.

More particularly, Metropolitan has documented sufficient *currently available* supplies to meet 100% of its member agencies' supplemental water demands (a) for 20 years under average-year and wet conditions, (b) for 15 years even under the repeat of the worst multiple dry-year conditions (with 8-26% reserve capacity), and (c) for 15 years even under the repeat of the worst single dry-year conditions (with 8-25% reserve capacity). With the addition of *supplies under development,* Metropolitan will be able to meet 100% of its agencies' supplemental water needs under all demand conditions through 2030 with 20-25% reserve capacity, even under a repeat of the worst drought. Metropolitan projects that it would have the capacity to reliably meet projected water demands through 2030, if its supply programs were implemented under its comprehensive resource plan and if current trends for retail demands and local supplies continue. Please refer to Metropolitan's *Report on Metropolitan's Water Supplies* (March 25,2003), Pages 23-25, Findings, as well as its *Regional Urban Water Management Plan* (December 2002) for more detailed discussion. In summary, the basis for Metropolitan's findings is the years of work and expense incurred in contingency planning and development of additional resources.

Metropolitan's margin of safety in its demand projections and its reserve supplies, together with the fact that the City of Huntington Beach relies on Metropolitan Water District's imported supplies only to supplement its groundwater resources, ensures the highest redundancy in planning for an adequate future supply for the coming 20 years, through dry and multiple dry years.

C. Water Supply Reliability

From the beginning of the 1900's until the start of the new millennium, providing water to naturally arid Southern California has been a big challenge, successfully met. On a macro level, there is a continually growing gap between Southern California's need for water and its firm supply. In Southern California, precipitation fluctuates from a low of under 5 inches per year, to more than 36 inches.

A key component of supply reliability, particularly in multiple dry-year scenarios, is the groundwater basin from which the City of Huntington Beach and all other basin producers pump. The basin is so vast, it is one of the largest underground water basins in the State, and serves as a supply regulator to smooth out the supply in those years in which local precipitation is below normal. Not only is the basin a source of water, it is also a geological feature which allows for the capture and storage of water, of recycled water produced by wastewater treatment plants, for water surplus to other uses around the state which can be conveyed to Southern California through the Metropolitan conveyance system, and for the sinking and conservation of rainwater and stormwater which flows down the River. See generally, the Orange County Water District's *Master Plan Report* (April 1999) for a discussion of groundwater and surface water storage programs relied upon by the Metropolitan Water District to enhance supply reliability, please refer to *The Regional Urban Water Management Plan for the Metropolitan Water District of Southern California* (December 2000), and *Report on Metropolitan's Water Supplies* (February 2002), particularly Appendices C and D.

Table 7 shows projected water demands in the City of Huntington Beach's service area for an average normal water year, a single dry-year, and multiple dry-years,[7] for a 20 year period. Data from the Municipal Water District of Orange County and the Metropolitan Water District of Southern California show that in dry years, urban areas require approximately 8 % more water than in normal years. Under alternative scenarios, over the next 20 years, the available water supply exceeds the water demand for the City of Huntington Beach, including the Pacific City Development and other planned future developments.

Table 7

Supply Reliability
(Acre Feet)

Normal Water Year	Single Dry Year	Multiple Dry Years
35,100 AF	Factor 1.08 = 37,900 AF	Factor 1.08 = 37,900 AF

Even in light of this reliability, the Orange County Sanitation District and the Orange County Water District have approved and are building a joint project, the Groundwater Replenishment System, to use highly treated sewage water to replenish the groundwater basin. According to the Water District, the project will be on-line in 2007.

[7]Ibid.

Section 5 – Coordination with Appropriate Agencies

As discussed above, the City of Huntington Beach has been able to secure a reliable, drought resistant water supply through coordination with other local, regional and state agencies. The two water supply sources available to the City, groundwater from the Orange County Groundwater Basin of the Santa Ana River and imported surface water from the Metropolitan Water District of Southern California, are managed pursuant to a system of institutional arrangements, agreements, permits, licenses, judgments and statutes. The quality of the water available to the City is regulated by the California Regional Water Quality Control Board, Santa Ana Region, and is managed, in part, by the Orange County Water District.

In preparing this Water Supply Assessment, information has been taken from not only the City's own publications, but from technical and planning publications of numerous state, regional, and local public agencies, each of which plays some coordinating role in maintaining the reliability of the City's water supply. Those publications include:

- The City's *2000 Urban Water Management Plan* (December 2000);
- *Preparing for California's Next Drought,* California Department of Water Resources (July 2000);
- *Emergency Management Plan, Water & Utilities,* City of Huntington Beach (December 2000);
- *Water System Master Plan/Financing Plan - 1995 Update,* City of Huntington Beach (March 1995);
- *Report on Metropolitan's Water Supplies,* Metropolitan Water District of Southern California (March 25, 2003);
- *Regional Urban Water Management Plan,* Metropolitan Water District of Southern California (2000);
- *Integrated Resources Plan Volumes 1 & 2,* Metropolitan Water District of Southern California (January 1996);
- *Water Surplus and Drought Management Plan,* Metropolitan Water District of Southern California (January 20, 2000);
- *2000 Regional Urban Water Management Plan,* Municipal Water District of Orange County (December 20, 2000);
- *Master Plan Report for the Orange County Water District,* Orange County Water District (April 1999);
- *Engineer's Report on Groundwater Conditions, Water Supply and Basin Utilization in the Orange County Water District,* Orange County Water District (1998-1999);
- *2020 Master Plan,* Orange County Water District (1998);
- *Strategic Plan Program EIR;* Orange County Sanitation Districts (1999); and
- Environmental Impacts Reports adopted by the above agencies.

The City has coordinated with the agencies that prepared the reports listed above, as well as state, regional and county planning agencies, to assess projected population growth and housing requirements. See Section 1, *2000 Urban Water Management Plan Update,* p. 1, City of Huntington Beach.

Coordination of pumping from the Orange County Groundwater Basin, and replenishment of the Basin occurs under the management of the Orange County Water District, which is organized under the Orange County Water District Act, Water Code Appendix section 40-1, *et seq.* For an in depth discussion of the inter-agency coordination involved in managing a reliable groundwater supply, please refer to Chapter 14, *Master Plan Report for the Orange County Water District,* Orange County Water District (April 1999).

The quantity and sources of the native surface supply to the Santa Ana River, which naturally replenishes the Orange County Groundwater Basin, is governed by the terms of judgments entered pursuant to settlement agreements among upper and lower Santa Ana River Basin water users. The quality of water is also highly regulated by the California Regional Water Quality Control Board, Santa Ana Region, which regulates the quality of water discharged to the River. The maintenance of the quality of the water supply relied on by the Orange County Water District is also secured by its membership in the Santa Ana Watershed Project Authority, a joint powers authority of each of the parties to one of the key adjudications, which purpose is to plan for and engage in projects to improve the water supply in the Santa Ana River and its basins. For further information about Santa Ana River governance, please review Chapter 5, *Master Plan Report for the Orange County Water District,* Orange County Water District (April 1999).

These arrangements, and other contractual arrangements have been refined since the formation of the Orange County Water District in 1933, the formation of the Metropolitan Water District of Southern California in 1928, and the organization of the Municipal Water District of Orange County in 1951. The combined ability of these water importers and regional suppliers can meet the needs of their member agencies, including the City of Huntington Beach. For additional information, please refer to Section 1, *2000 Regional Urban Water Management Plan,* Municipal Water District of Orange County (December 20, 2000).

As stated in the City of Huntington Beach's *2000 Urban Water Management Plan*:

> The City Water Department Staff coordinated development of this plan with the City Administrator's Office, Public Works Department, Community Development Department, Economic Development Department, and the City Clerk's office. Development of the Plan was also coordinated with the Municipal Water District of Orange County (MWDOC), which serves as the City's wholesaler of water received from the Metropolitan Water District of Southern California (MWD), and the Orange County Water District (OCWD), which manages the Santa Ana River groundwater basin; and the Orange County Sanitation District (OCSD), which manages wastewater. Appendix A (of the UWMP) lists the numerous references used benefiting development of this plan.[8]

For descriptions of the coordination efforts of agencies with whom the City of Huntington Beach has coordinated, please refer to Introduction, and Appendix E, *Report on Metropolitan's Water Supplies,* Metropolitan Water District of Southern California (February 11, 2002); and Section 1, *2000 Urban Water Management Plan,* City of Huntington Beach, (December 2000), p. 1-1.

[8]Section 1, Urban Water Management Plan.

Section 6 – Water Shortage Plans, Prohibitions and Mandatory Measures

Section 6 of the City of Huntington Beach's *2000 Urban Water Management Plan* describes how the City will respond to various levels of water shortages. The Orange County Water District, the Metropolitan Water District of Southern California and the Municipal Water District of Orange County have programs in place to manage water shortage conditions. As stated in the City's 2000 *Urban Water Management Plan* (Section 6),

> "Any violation of the City's Water Management Program, including the waste of water and excessive use, is a misdemeanor. In addition to any other remedies that the City may have for enforcement service of water would be discontinued or appropriately limited to any customer who willfully uses water in violation of any provision of the ordinance."[9]

The statewide water systems providing water to Huntington Beach have developed and implemented programs to manage water shortages. The City has enacted its own ordinance to address water shortages, and the provisions of the California Water Code, at section 350, *et seq.*, provide for public hearings on the adoption of water shortage plans.

[9]City of Huntington Beach, *2000 Urban Water Management Plan* (December 2000).

Section 7 – Conclusion

The City of Huntington Beach can provide adequate water supply for the proposed development, with planned system improvements, in accordance with the adopted Water Master Plan. Similarly, with supplies under development, Metropolitan Water District can reliably meet projected supplemental demands beyond the next 20 years. The total water supply available to the City during normal, single dry and multiple dry years within a 20-year projection will meet the projected water demand of the Pacific City Development, as well as the demand of existing and other planned future uses, including agricultural uses.

Section 8 – Sources Consulted and References

1. California Department of Water Resources, *Preparing for California's Next Drought,* July 2000
2. City of Huntington Beach, Ordinances, Chapter 14.18, *Water Management Program*
3. City of Huntington Beach, *2000 Urban Water Management Plan,* December 2000
4. City of Huntington Beach, *City of Huntington Beach Web Site*

   http:/www.scag.org/homepages/huntington_beach/govt.htm, November 2000
5. City of Huntington Beach, *Emergency Management Plan, Water & Utilities,* 1999
6. City of Huntington Beach, *Water System Master Plan/Financing Plan B 1995 Update,* March 1995
7. Metropolitan Water District of Southern California, *Report on Metropolitan's Water Supplies,* February 11, 2002
8. Metropolitan Water District of Southern California, *Regional Urban Water Management Plan,* 2000
9. Metropolitan Water District of Southern California, *Integrated Resources Plan,* Vol. 1 & 2, Report Number 1107, January 1996
10. Metropolitan Water District of Southern California, *Water Surplus and Drought Management Plan,* January 1999
11. Municipal Water District of Orange County, *2000 Regional Urban Water Management Plan,* December 20, 2000
12. Orange County Water District, *Master Plan Report for the Orange County Water District,* April 1999
13. Orange County Water District, *Engineer's Report on Groundwater Conditions, Water Supply and Basin Utilization in the Orange County Water District,* 1998-1999
14. Orange County Water District, *2020 Master Plan,* October 1998
15. Orange County Sanitation Districts, *1999 Strategic Plan Program EIR,* June 1999
16. Environmental Impact Reports adopted by the above agencies (list available upon request).

Section 9 – Appendix

- Assessment of Water Supply Form
- Huntington Beach Website Home Page
- City Ordinance Adopting Water Conservation Program
- The City of Huntington Beach has a copy of each of the documents listed in Section 8 for public inspection

CITY OF HUNTINGTON BEACH
ASSESSMENT OF WATER SUPPLY

Water Code §10910, *et seq.*
City of Huntington Beach Municipal Code Chapter 14.18

To: *(Lead Agency)*
City of Huntington Beach

(Applicant)
Makar Properties, LLC
4100 MacArthur Boulevard, Suite 200
Newport Beach, CA 92660-2064

Project Land Use Information

Project Title: Water Supply Assessment for Pacific City Development

		Quantity	Duty Factor	Flow
☒	*Residential:*	540 Condominiums	400 gpd/DU	216,000
☒	*Retail:*	130,000 sq. ft.	.15 gpd/sq. ft.	19,500
☒	*Commercial:*	60,000 sq. ft.	0.3 gpd/sq. ft.	18,000
☒	*Hotel or motel:*	400 Rooms	225. gpd/Room	90,000
☒	*Restaurant:*	50,000 sq. ft.	1.5 gpd/sq. ft.	75,000
☐	*Industrial, manufacturing or processing:*			
☐	*Mixed use (check and complete all above that apply):*			
☐	*Other:* Office :	60,000 sq. ft.	0.3 gpd/sq. ft.	18,000

Verification of Assessment of Availability of Water Supply

On _____, 2002, the City of Huntington Beach made the following determination regarding the above-described project:

☒ The projected water demand for the project was included in the City of Huntington Beach's most recently adopted urban water management plan.

☐ The projected water demand for the project was not included in the City of Huntington Beach's most recent adopted urban water management plan.

☒ A sufficient water supply is available for the project.
The total water supplies available to the City of Huntington Beach during normal, single-dry and multiple-dry years with a 20-year project will meet the project water demand of the project in addition to the demand of existing and other planned future uses, including, but not limited to, municipal and industrial uses.

☐ A sufficient water supply is not available for the project. *[Plan for acquiring and developing sufficient supply attached. Water Code § 10911(a)]*

The foregoing determination is based on the Water Supply Assessment information and supporting information in the records of the Department of Public Works of the City of Huntington Beach, the Metropolitan Water District of Southern California, the Municipal Water District of Orange County, and the Orange County Water District.

_____
Signature Date Title

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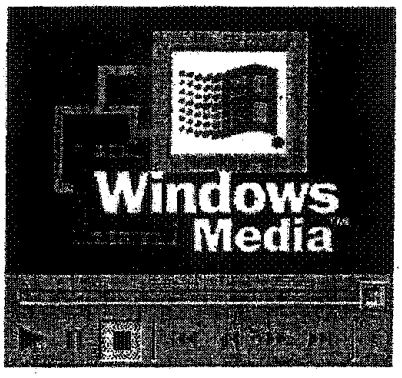


Tour Surf City

Description of Page Header Photos

Chapter 14.18

WATER MANAGEMENT PROGRAM

(3104-4/91)

Sections:

14.18.010 Declaration of policy. California Water Code Section 375 et seq. permit public entities which supply water at retail to adopt and enforce a Water Management Program to reduce the quantity of water used by the people therein for the purpose of conserving the water supplies of such public entity. The City Council hereby establishes a comprehensive Water Management Program pursuant to California Water Code Section 375 et seq., based upon the need to conserve water supplies and to avoid or minimize the effects of any future shortage. (3104-4/91)

14.18.020 Findings. The City Council finds and determines that a water shortage could exist based upon the occurrence of one or more of the following conditions:

(a) A general water supply shortage due to increased demand or limited supplies. (3104-4/91)

(b) A major failure of the supply, storage and distribution facilities of the Metropolitan Water District of Southern California, or of the City occurs. (3104-4/91)

(c) A local or regional disaster which limits the water supply. (3104-4/91)

The City Council also finds and determines that the conditions prevailing in the Huntington Beach area require that the water resources available be put to maximum beneficial use to the extent to which they are capable, and that the waste or unreasonable use, or unreasonable method of use, of water be prevented and that the conservation of such water be encourage with a view to the maximum reasonable and beneficial use thereof in the interests of the people of the City and for the public welfare. (3104-4/91)

14.18.030 CEQA exemption. The City finds that this chapter and actions taken hereafter pursuant to this chapter are exempt from the California Environmental Quality Act as specific actions necessary to prevent or mitigate an emergency pursuant to Public Resources Code Section 21080 (b)(4) and the California Environmental Quality Act Guidelines Section 15269(c). The City Administrator of the City is hereby authorized and directed to file a Notice of Exemption as soon as possible following adoption of this chapter. (3104-4/91)

14.18.040 Application. The provisions of this chapter shall apply to all persons, customers, and property served by the City. (3104-4/91)

14.18.050 Authorization. The City's Director of Public Works and the City Administrator, or their designated representative, are hereby authorized and directed by the City Council to implement the provisions of this chapter as specifically set forth in the Water Management Program; provided however that, any actions taken by them pursuant herewith shall be confirmed at the earliest practicable time by the City Council. (3104-4/91)

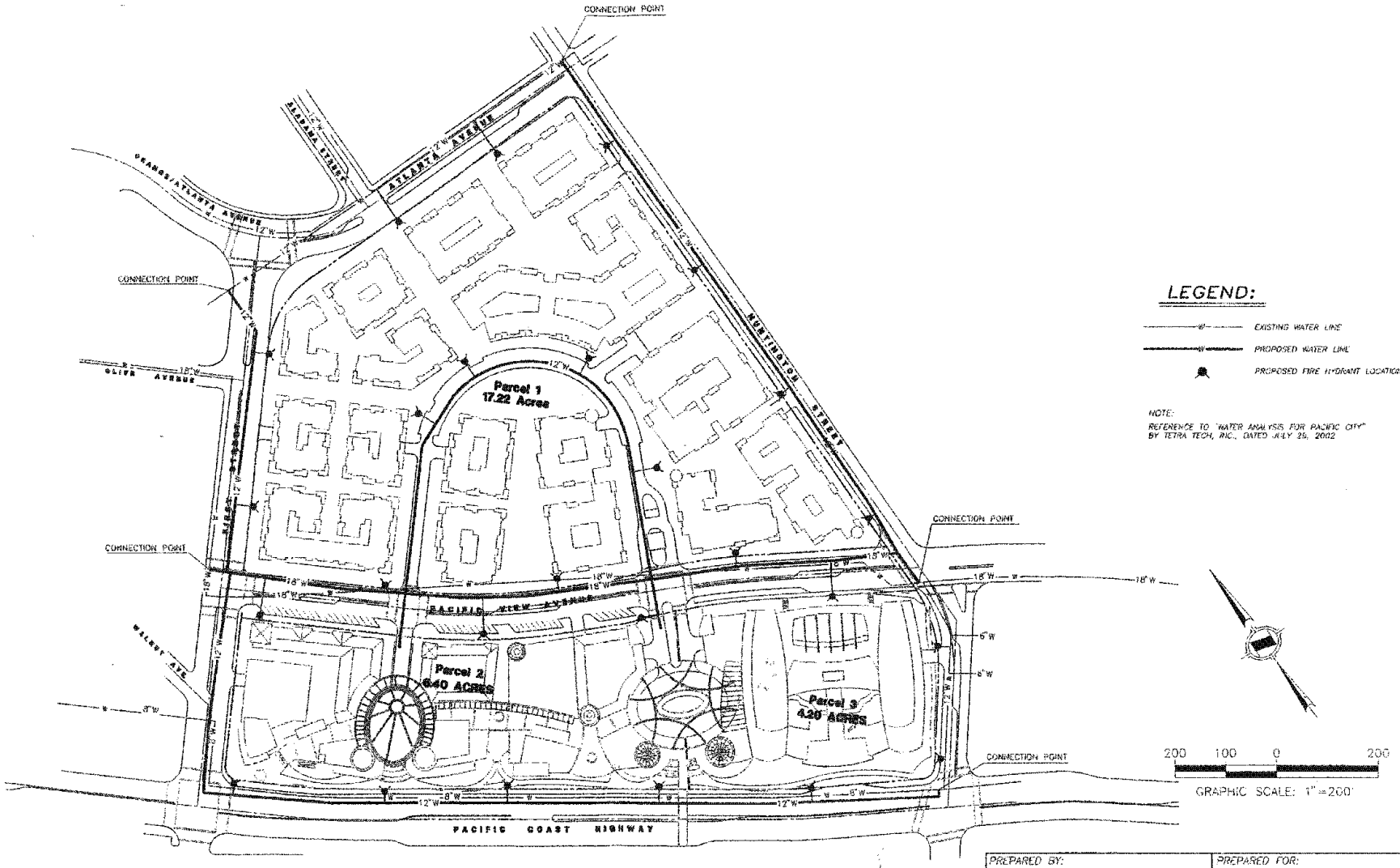
14.18.060 Mandatory conservation phase implementation. The City shall monitor the projected supply and demand for water by its customers. The Director of Public Works shall determine the extent of the conservation required through the implementation and/or termination of particular conservation stages in order for the City to prudently plan for and supply water to its customers. The City Council shall direct the City Administrator to order that the appropriate stage of water conservation be implemented or terminated at any time it determines appropriate in accordance with the applicable provision of this chapter. However, in case of local emergencies as defined under the Huntington Beach Municipal Code, the City Administrator shall have the authority to order the implementation of the appropriate stage of water conservation subject to ratification by the City Council within seven (7) days thereafter or such order of the Director of Public Works shall have no further force or effect. (3104-4/91)

14.18.070 Penalty. Any violation of this chapter is a misdemeanor. In addition to any other remedies which the City may have for the enforcement of this Ordinance, service of water shall be discontinued or appropriately limited to any customer who willfully uses water in violation of any provision hereof. (3104-4/91)

4/91

HUNTINGTON BEACH, CALIFORNIA

WATER LINE EXHIBIT FOR
PACIFIC CITY



PREPARED BY:
HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING

PREPARED FOR:
ATLANTA HUNTINGTON BEACH, LLC
4100 MACARTHUR BLVD. SUITE 200
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(949) 622-8400

SHEET 1 OF 1 SHEETS

DATE: 11/27/02
W.O. 2198-13X
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DOMESTIC WATER SYSTEM AND SANITARY SEWER SYSTEM CEQA SUPPORT INFORMATION

For

PACIFIC CITY

City of Huntington Beach

November 27, 2002

Prepared For:

MAKAR PROPERTIES, INC.

4100 MacArthur Blvd.,
Suite 150
Newport Beach, CA 92658

Prepared By:

HUNSAKER & ASSOCIATES IRVINE, INC.

Three Hughes
Irvine, CA 92618
(949) 583-1010

W.O.#: 2198-13/H20&SwrCEQAPacific City

Domestic Water and Sanitary Sewer CEQA Support Information for Pacific City Development

Prepared for:

Makar Properties, LLC
4100 MacArthur Boulevard, Suite 200
Newport Beach, CA
92660-2064

Prepared by:

Hunsaker & Associates Irvine, Inc.
3 Hughes
Irvine, CA 92618
(949) 583-1010

November 27, 2002

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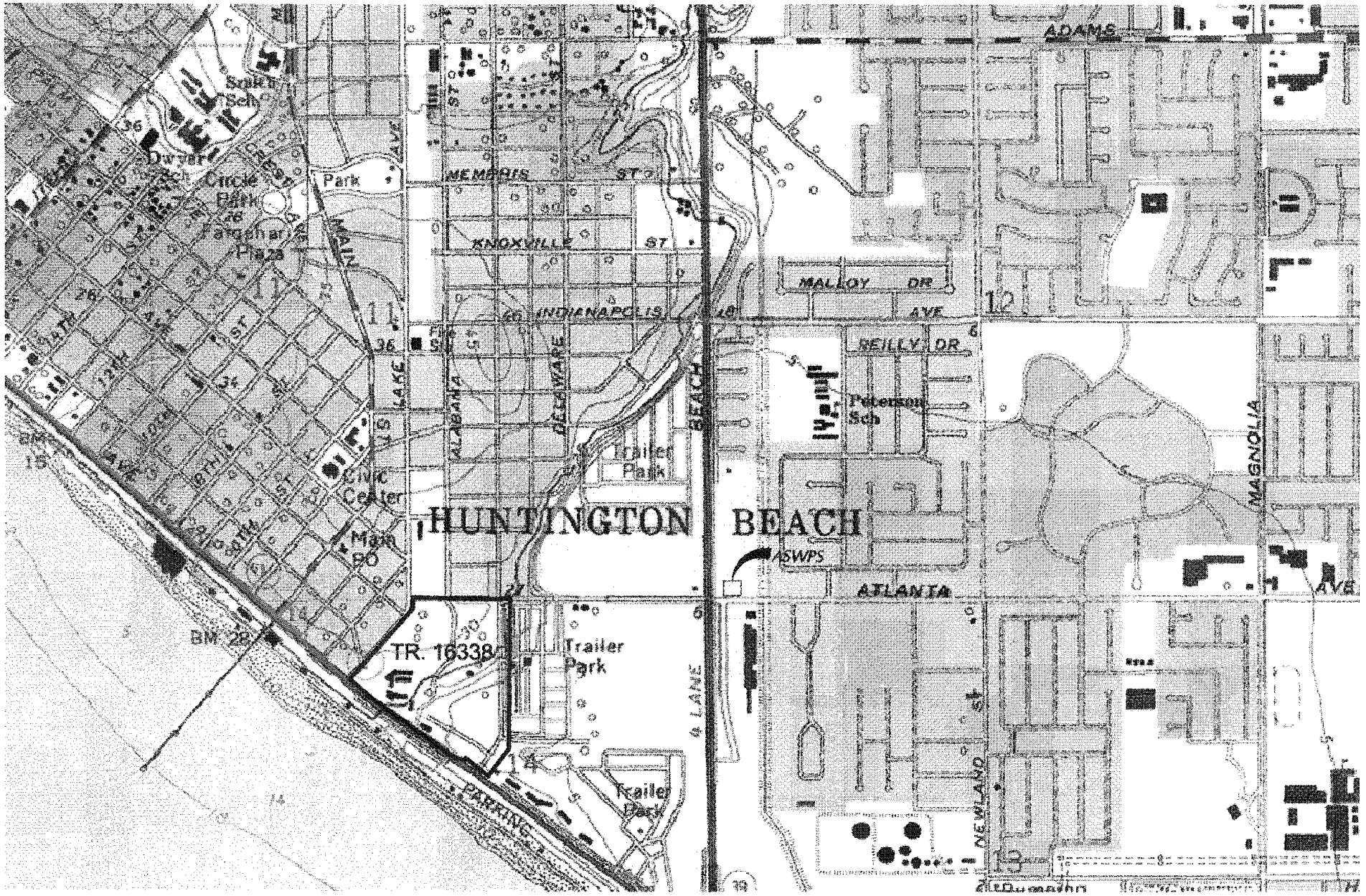
I. GENERAL

This memorandum pertains to the domestic water and sanitary sewer elements of the subject project in the City of Huntington Beach. Water and sewer facility recommendations shown on the attached exhibits reflect the current project concept and the design guidelines of the City of Huntington Beach.



NORTH

NOT TO SCALE

PACIFIC CITY
PROJECT LOCATION

EXHIBIT # 1

DATE: 11/27/02
W.O. 2196-13X
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PREPARED BY:
HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

II. DOMESTIC WATER SYSTEM

Water Supply Assessment

A Water Supply Assessment for the Pacific City project has been prepared in accordance with the new State laws referred to as the "Kuehl Bill" (SB 221) and the "Costa Bill" (SB 610). Said assessment demonstrates that the City of Huntington Beach has an adequate water supply for this project. The Water Supply Assessment, dated August 23, 2002, was prepared under the direction of the City of Huntington Beach and submitted under separate cover.

Water Distribution System

The existing project area water system has sufficient capacity for existing development and the commercial expansion projects east of the Pacific City project. The construction of the Pacific City project will further enhance the City's domestic water system in the area with some off-site water pipeline construction. Upon completion of the off-site water system improvements, the water supply will be delivered to the project through the City's improved domestic water distribution system.

The water supply for the project will be delivered to the area through the City's improved backbone water system. The off-site water supply can be described as follows:

- A water supply available from the north through a 20-inch pipeline in Lake Street, and the direct connection to the project site through a 18-inch pipeline located on the project site. The 18-inch water main is part of the water supply for the Hilton Hotel and the Water Front development, east of the 31 acre project.
- A water supply from the west through a 12-inch pipeline continued in First Street to Pacific Coast Highway (PCH).
- Additional water supplies from the north through a 12-inch pipeline system in Atlanta Avenue.
- A water supply from the south and east through a 12-inch water main in PCH.
- The City of Huntington Beach is currently constructing an extension of the 18-inch pipeline to connect to a new 12-inch main in Beach Boulevard.

The City's Water Department staff directed the computer model testing of the proposed 31 acre project be prepared by Tetra Tech, Inc., using the water demands developed in this investigation for the site and planning data for the remaining water system service area. The analysis dated July 29, 2002, recommended the following list of water system pipelines be constructed with the development of the Pacific City project.

A. A new 18-inch water main on Pacific View Avenue between First Street and Huntington Street.

B. A new 12-inch water main in Huntington Street that will connect to an existing 12-inch water main in Atlanta Avenue and with an existing water main in Huntington Street as well as to the new 18-inch water main in Pacific View Avenue.

C. A new 12-inch water main in First Street (in the public right-of-way) that will connect to the existing 12-inch water main in Atlanta Avenue and with the new 18-inch water main in Pacific View Avenue.

D. A new 12-inch water main in First Street that will connect to a new 12-inch water main in Pacific Coast Highway and with the new 18-inch water main in Pacific View Avenue.

E. A new 12-inch water main in Pacific Coast Highway that will connect with the new 12-inch water main in First Street and with an existing 12-inch water main in Huntington Street.

F. The proposed 12-inch water main in Huntington Street should be constructed and put into service prior to taking the 18-inch water main out of service.

Upon completion of the proposed pipeline realignments and supplemental inter-ties to adjacent domestic water system infrastructure, the City's domestic water system will be enhanced beyond it's current capabilities.

Estimated Water Demands

The estimated water demands are based design criteria for the City of Huntington Beach and the current project development concept. City peaking factors of 1.6 and 2.5 were applied to the average day demand to estimate maximum day and peak hour demands, respectively . A summary of the principal water demand elements are as follows:

Water Demand Type	Million Gallons Per Day	Gallons Per Minute
Average Day Demand	0.42	292
Maximum Day Demand	0.67	467
Peak Hour	1.05	730
Maximum Fire Flow	5.755	4,000

Land Use	Quantity	Duty Factor	Estimated Flow
Condominiums	540 DU's	400. gpd/DU	216,000
Hotel	400 Rooms	225. gpd/Room	90,000
Office	60,000 SF	0.3 gpd/SF	18,000
Rest/Brewery	50,000 SF	1.5 gpd/SF	75,000
Retail	130,000 SF	0.15 gpd/SF	19,500
Total			**418,500 gpd**
Total			**0.42 mgd**
Max Day Q	**1.6 x Qa**		**0.67 mgd**
Peak Hour Q	**2.5 x Qa**		**1.05 mgd**

Estimated Water Demand Background

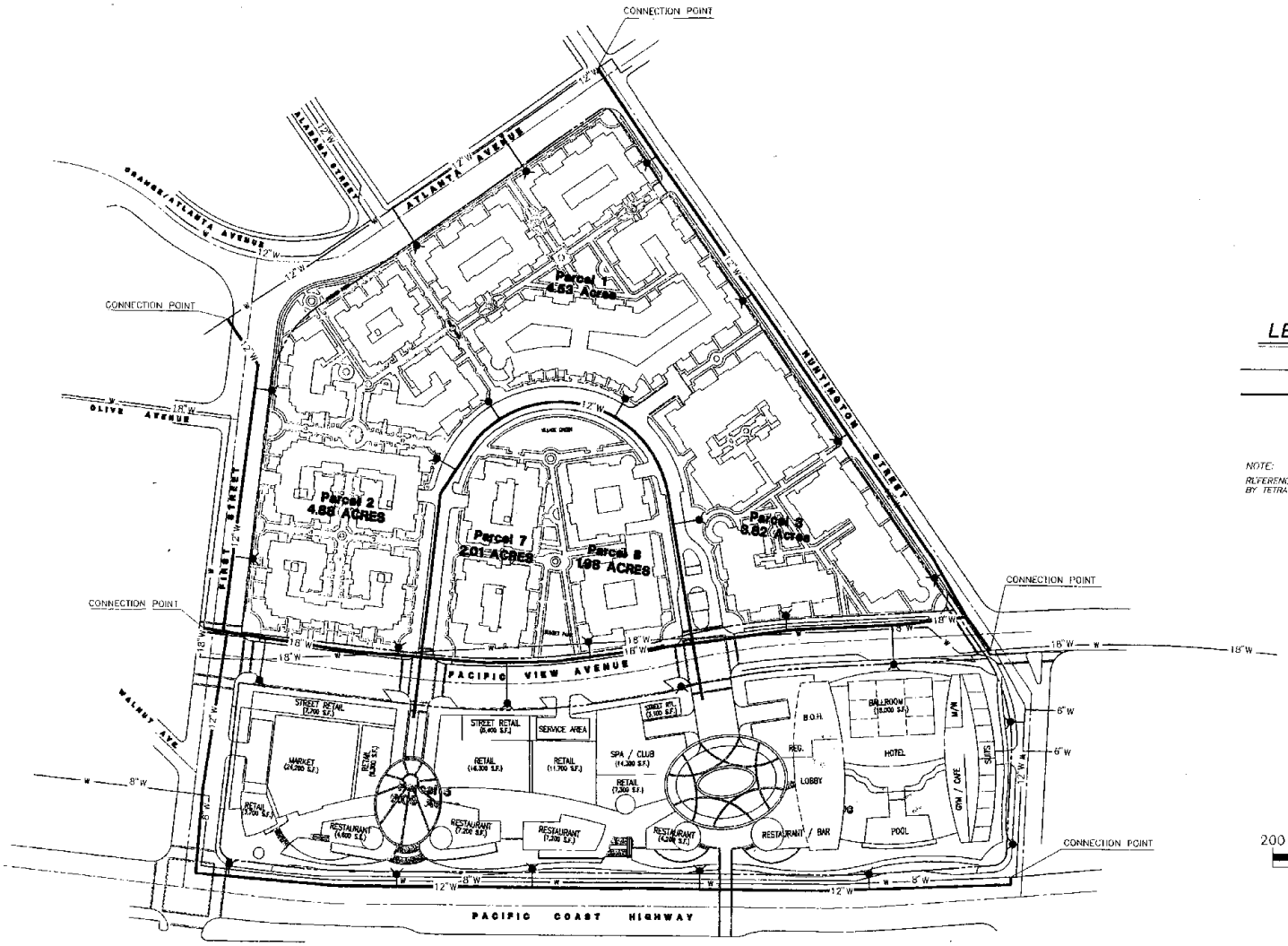
1. **Condominiums:** 180 gpcd x 2.2 people per DU = 400 gpd/DU.
2. **Hotel:** 150 gpd/room x 1.5 = 225 gpd/DU.
3. **Office: 300 gpd/1000 SF = 0.3 gpd/SF.**
4. **Restaurant/Brewery: = 1.5 gpd/SF.**
5. **Retail:** 0.15 gpd/SF.

The reader will notice the estimated water demands exceed the estimated sewer flows for all proposed land use categories. Typically, each of the unit flows used are standard design approximations for average land use cases. The water demand and sewer flows estimates are not precise by nature of averaging of the type of land use employed. These estimates will however provide a comfortable measure for design purposes for both the water and the sewer system. As an example, the proposed project will include approximately 11 acres of irrigated landscaping. This landscape irrigation will account for a major portion of the estimated flow requirement differences.

Makar Properties is committed to the use of current BMPs for water conservation, including residential, commercial and irrigation water uses. All systems will be in accordance with the City's current Urban Water Management Plan.

HUNTINGTON BEACH, CALIFORNIA

WATER LINE EXHIBIT FOR
PACIFIC CITY



LEGEND:

- EXISTING WATER LINE
- PROPOSED WATER LINE
- PROPOSED FIRE HYDRANT LOCATION

NOTE:
REFERENCE TO "WATER ANALYSIS FOR PACIFIC CITY" BY TETRA TECH, INC., DATED JULY 29, 2002

200 100 0 200

GRAPHIC SCALE: 1"=200'

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III. SANITARY SEWER SYSTEM

Regional Sewer Capacity

The Orange County Sanitation District (OCSD) provides regional wastewater collection, treatment and disposal services for the City of Huntington Beach. The OCSD proposes to provide regional sewer service to the City of Huntington Beach for the Pacific City Mixed Use project through a new connection to the District's 54-inch diameter Coast Trunk Sewer. A new public sewer system, owned and operated by the City of Huntington Beach, will provide the connection to the District's Coast Trunk Sewer to an existing OCSD manhole located a the intersection of Walnut Avenue and First Street. Additional private sewer laterals will be constructed from the Pacific City project to the new Huntington Beach sewer at various locations along the new public sewer.

By letter dated October 30, 2002, the OCSD has advised the City of Huntington Beach that the District has adequate capacity in the Coast Trunk Sewer to serve the Pacific City project. The OCSD estimates the current flow in the Coast Trunk Sewer to be approximately 6.6 mgd and the sewer capacity to be approximately 44 mgd. The Pacific City project will add an estimated 0.472 mgd to the Coast Trunk sewer. The OCSD estimates there will be more than 30 mgd of unused peak flow capacity through the year 2020. By the discussion above, it can be seen that there will be an "insignificant impact" to the Coast Trunk Sewer capacity.

Should construction scheduling interfere with the collection of all or a portion of the sanitary wastes from the 31 Acre project, an alternative connection to the District's 54-inch sewer could be made along PCH. Construction would require the installation of a steel casing, jacked in-place across PCH to the 54-inch sewer. A new gravity sewer, appropriately sized for the estimated sewer flows to be collected, would be installed in the casing and connected to the 54-inch sewer. Construction of this type would require an Encroachment Permit from Caltrans.

Sewer Collection System

Public Sewer System: The concept design for the public and private portions of the new sanitary sewer system can be seen schematically on the attached "Sewer Line" exhibit. The public sewer system will begin at the Coast Trunk Sewer manhole in Walnut Avenue and First Street. The City's first manhole is designated as Manhole Number 1 on the attached exhibit. A 12-inch sewer is proposed to be constructed between the Coast Trunk Sewer and Manhole Number 1 and north to Manhole Number 2 at First Street and Pacific View Avenue. A 10-inch sewer is proposed to be constructed between Manhole Numbers 2, 3, 8 and 9. The sewer is proposed as 8-inch diameter from Manhole Number 9 through Manhole Numbers 11 and 12 in Pacific View Avenue.

This preliminary design concept proposes that approximately 42 dwelling units from Parcel 3 and the Hotel would be served directly from the public sewer in Pacific View Avenue as would the remaining portion of the mixed used development consisting of office, commercial and food and beverage development. Grease traps will be required on all sewer laterals serving food preparation and entertainment establishments as required by the Building Department of the City of Huntington Beach. The owners of the establishments or the Commercial HOA will be required to service the grease traps on a regular basis in order that the grease traps provide the public sanitary sewer system with the required protection from grease build up.

Wastewater Flow Estimates Background

1. **Condominiums:** 85 gpcd x 2.2 people per DU = 187 gpd/DU.
2. **Hotel:** 150 gpd/room.
3. **Office:** 200 gpd/1000 SF = 0.2 gpd/SF.
4. **Restaurant/Brewery:** = 1 gpd/SF.
5. **Retail:** 0.1 gpd/SF.

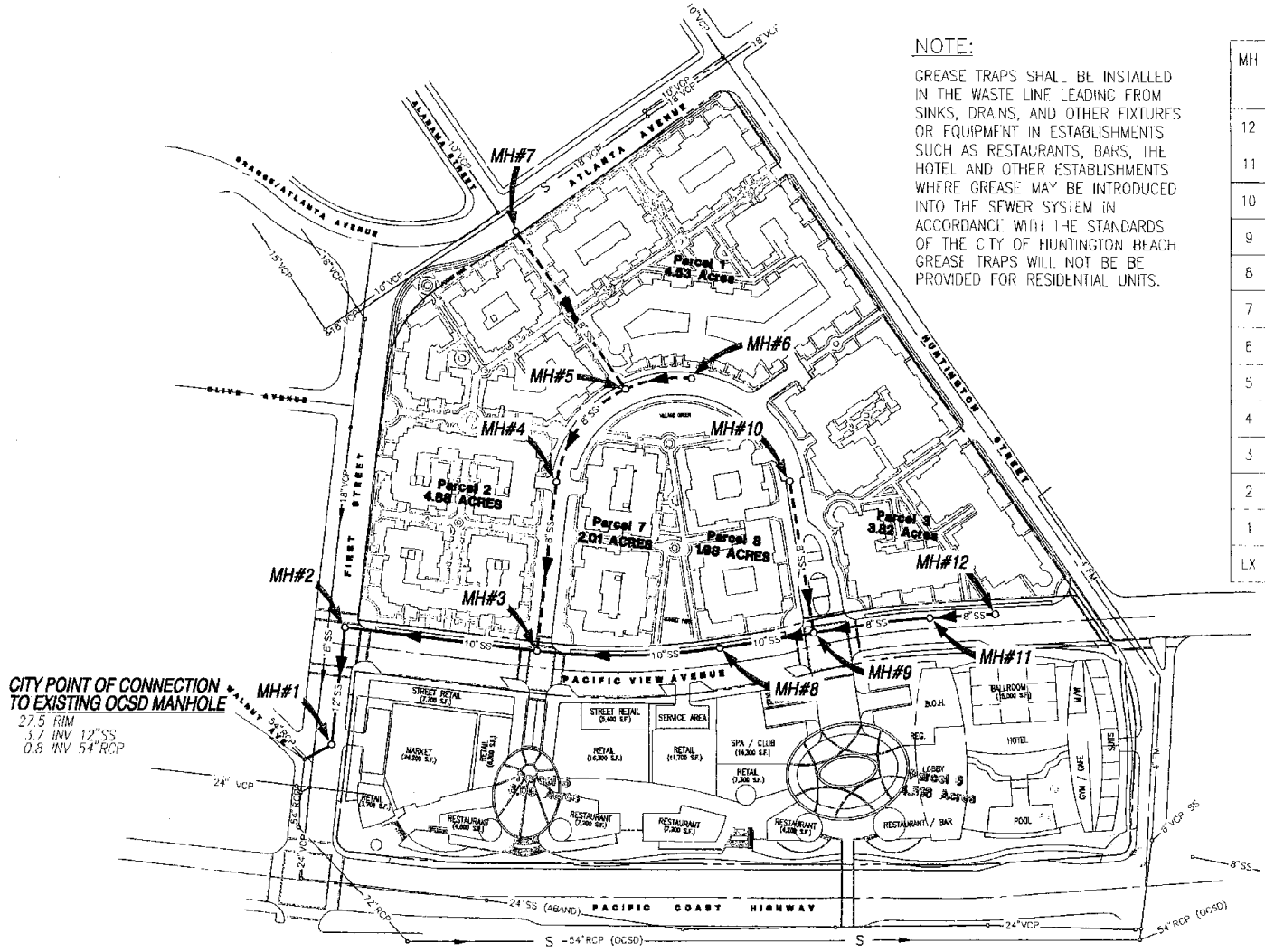
Appendix

- "Water Analysis for Pacific City", by Tetra Tech, Inc., dated July 29, 2002
- Orange County Sanitation District response to City of Huntington Beach request for sewer capacity, dated "August 20, 2002".

HUNTINGTON BEACH, CALIFORNIA

SEWER LINE EXHIBIT FOR

PACIFIC CITY



NOTE:

GREASE TRAPS SHALL BE INSTALLED IN THE WASTE LINE LEADING FROM SINKS, DRAINS, AND OTHER FIXTURES OR EQUIPMENT IN ESTABLISHMENTS SUCH AS RESTAURANTS, BARS, THE HOTEL AND OTHER ESTABLISHMENTS WHERE GREASE MAY BE INTRODUCED INTO THE SEWER SYSTEM IN ACCORDANCE WITH THE STANDARDS OF THE CITY OF HUNTINGTON BEACH. GREASE TRAPS WILL NOT BE BE PROVIDED FOR RESIDENTIAL UNITS.

PROPOSED SEWER SYSTEM

MH	Elevations (ft)	Dwelling Unit (DU's)	Qa (mga)	ΣQa (mgd)	Qp (mgd)	Reach & Length	Pipe Slope (%)	Pipe Size (in)	D/d
12	15.7 RIM 10.0 INV	42	0.0079	0.0079	0.0206	12-11 111'	0.40	8	0.139
11	22.0 RIM 9.56 INV	HOTEL	0.0600	0.0679	0.1498	11-10 202'	0.40	8	0.378
10	29.2 RIM 17.2 INV	134	0.0251	0.0251	0.0599	10-9 266'	3.14	8	0.142
9	30.0 RIM 8.65 INV	RETAIL	0.0250	0.1179	0.2490	9-8 162'	0.40	10	0.361
8	34.0 RIM 7.80 INV	RETAIL	0.0250	0.1429	0.2972	8-3 319'	0.40	10	0.397
7	30.5 RIM 18.0 INV	135	0.0252	0.0252	0.0603	7-5 335'	1.00	8	0.188
6	28.9 RIM 16.0 INV	86	0.0161	0.0161	0.0398	6-5 115'	1.13	8	0.149
5	29.6 RIM 14.6 INV	24	0.0045	0.0458	0.1044	5-4 207'	1.59	8	0.220
4	30.3 RIM 11.1 INV	59	0.0110	0.0568	0.1273	4-3 295'	1.48	8	0.247
3	33.3 RIM 10.0 INV	60	0.0112	0.2110	0.4253	3-2 336'	0.40	10	0.485
2	28.2 RIM 4.88 INV	RETAIL	0.0250	0.2360	0.4715	2-1 200'	0.40	12	0.391
1	27.7 RIM 3.88 INV			0.2360	0.4715	1-EX 49'	0.40	12	0.391
LX	27.5 RIM 3.70 INV	–	–	0.2360	0.4715				

LEGEND:

- S — EXISTING SEWER LINE
- S — PROPOSED PUBLIC SEWER LINE
- S - - - PROPOSED PRIVATE SEWER LINE
- o PROPOSED SEWER MANHOLE

200 100 0 200

GRAPHIC SCALE: 1"=200'

DATE: 11/27/02
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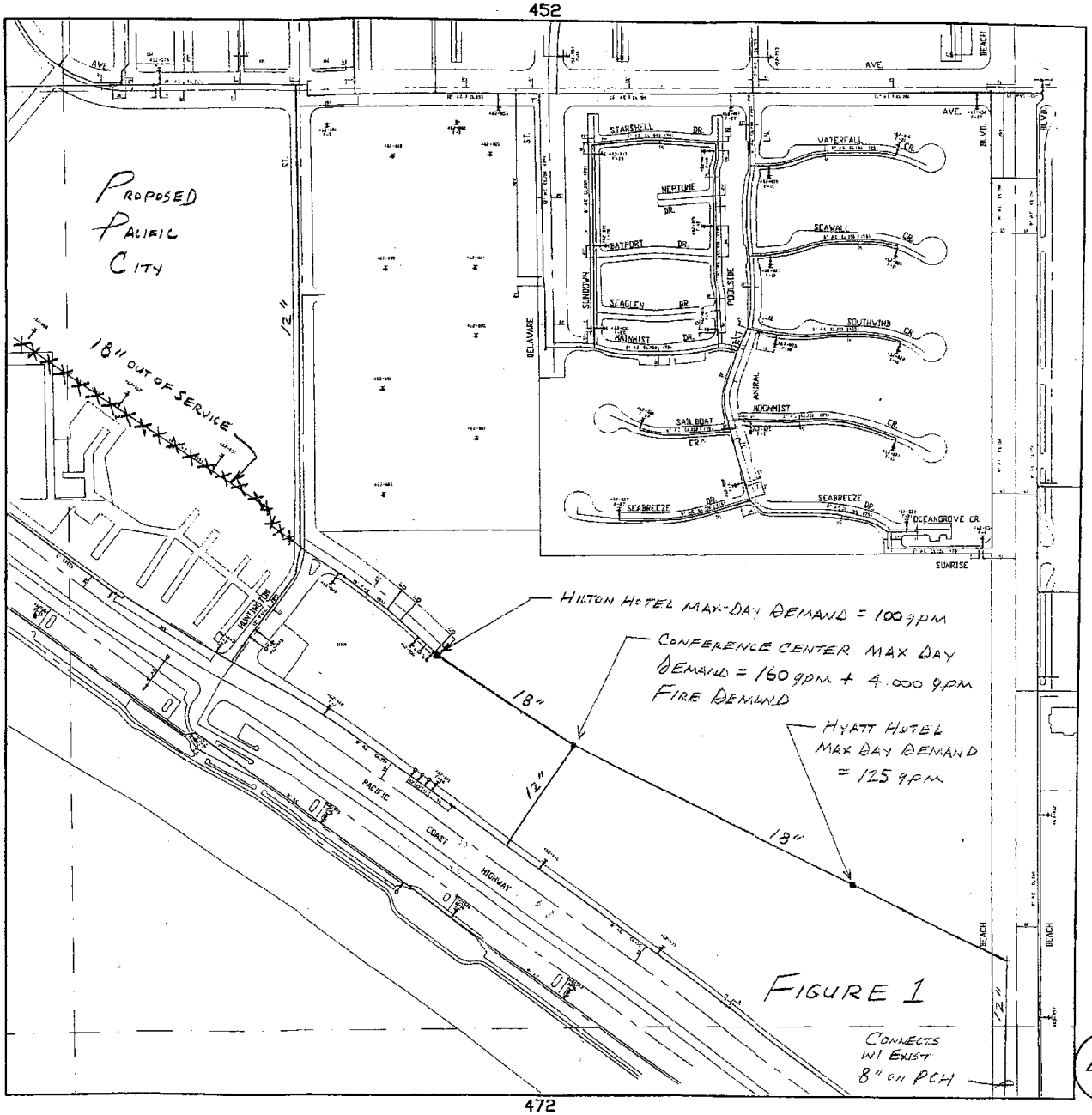
SHEET 1 OF 1 SHEETS



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NOTES:

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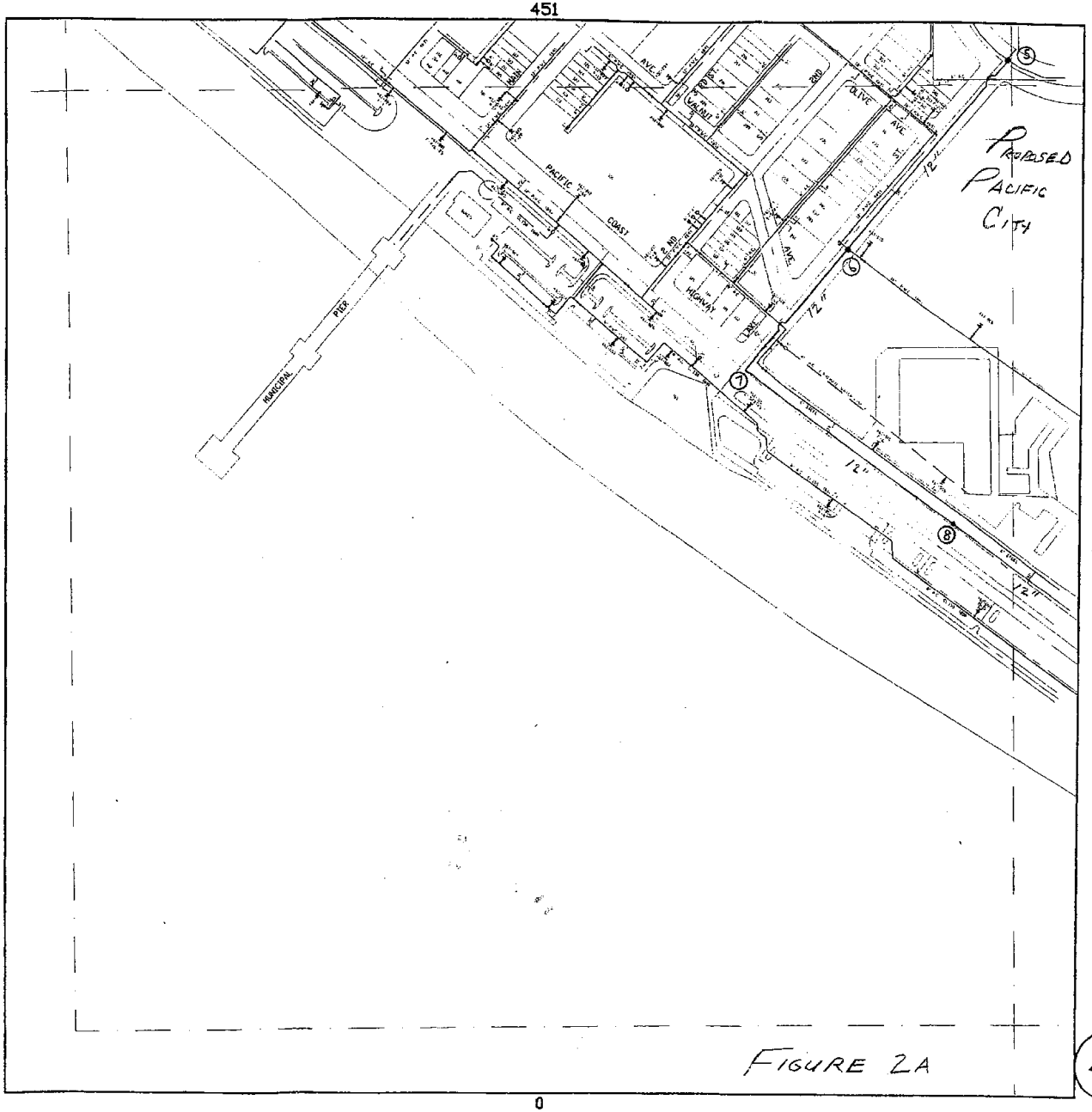

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FIGURE 2A

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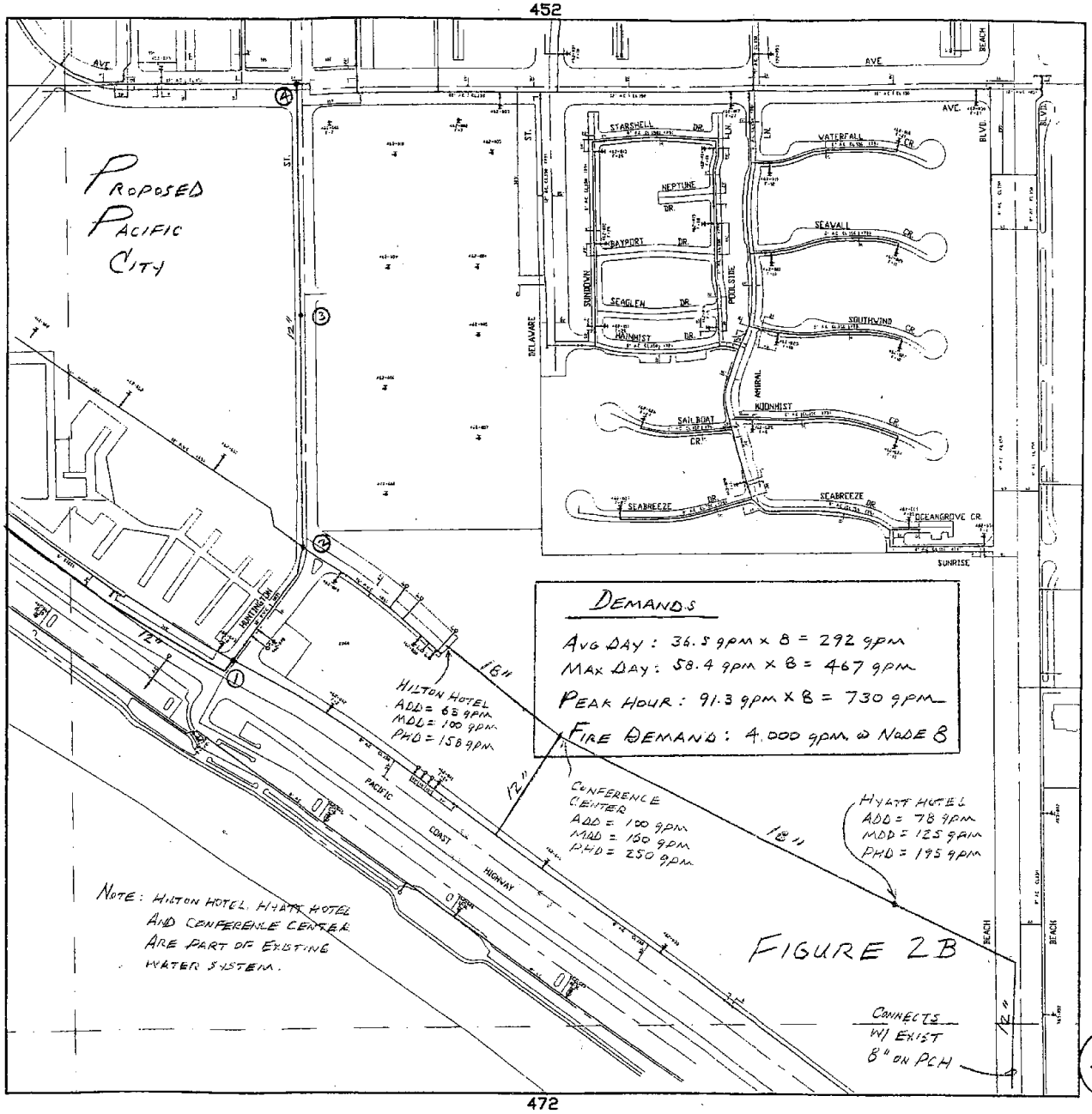
452
461
463
472
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0 50 100 200 300
N
PROPOSED PACIFIC CITY
DEMANDS
AVG DAY: 36.5 gpm x 8 = 292 gpm
MAX DAY: 58.4 gpm x 8 = 467 gpm
PEAK HOUR: 91.3 gpm x 8 = 730 gpm
FIRE DEMAND: 4,000 gpm @ NODE 8
HILTON HOTEL
ADD = 63 gpm
MDD = 100 gpm
PHD = 158 gpm
CONFERENCE CENTER
ADD = 100 gpm
MDD = 150 gpm
PHD = 250 gpm
HYATT HOTEL
ADD = 78 gpm
MDD = 125 gpm
PHD = 195 gpm
NOTE: HILTON HOTEL, HYATT HOTEL AND CONFERENCE CENTER ARE PART OF EXISTING WATER SYSTEM.
CONNECTS W/ EXIST 8" ON PCH
PACIFIC COAST HIGHWAY
DELAVARE ST.
SUNDOWN
POOL SITE
STARSHELL DR.
NEPTUNE DR.
BAYPORT DR.
SEAGLEN DR.
HAWKMIST DR.
WATERFALL CR.
SEAVALL CR.
SOUTHWIND CR.
ADMIRAL
KIONMIST
SAILBOAT CR.
SEABREEZE DR.
SEABREEZE
OCEANGROVE CR.
SUNRISE
BEACH BLVD.
AVE.
ANNINGTON
16"
12"
10"
8"
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PLV
08/16/96
PLV

FIGURE 2B

Sewer hydraulic calculations are provided in tabular form on the Sewer Line exhibit.

Private Sewer System: A private sewer system will be constructed to serve the mainly onsite development of the remaining residential development located north of Pacific View Avenue. The private sewer concept proposes that 8-inch sewers be constructed in looped access road serving the multifamily development. The sewers would be constructed to "public" sewer standards using manholes in lieu of cleanouts where access to the sewer manholes is available. An additional reach of private sewer constructed to public sewer standards would be provided between Manhole Numbers 7 and 5. All of the sanitary sewers described would be constructed at a minimum slope of 1 percent. In some cases, steeper slopes will be required in order to connect with the public sewer system. Grease traps would not be required for the residential portion of the Pacific City project.

It is assumed that private sewer constructed through the parking structures located under the multifamily development would be constructed at a minimum slope of 2 percent or as modified with the approval of the City Building Department. The Residential HOA would provide the necessary maintenance of the private sewer systems. The major sewer line hydraulics are shown in tabular form on the attached Sewer Line exhibit.

Estimated Sewer Flow Summary

- Estimated Average Sewer Flow = **0.236 mgd**
- Estimated Peak Flow = 1.78(Qavg.)^0.92 = **0.472 mgd**

The quantity of wastewater expected to be generated from the 31 Acre project are shown in the following calculations and are based upon design criteria for the City of Huntington Beach.

Estimated Sewer Flows

Land Use	Quantity	Duty Factor	Estimated Flow
Condominiums	540 DU's	187.0 gpd/DU	100,980
Hotel	400 Rooms	150.0 gpd/Room	60,000
Office	60,000 SF	0.2 gpd/SF	12,000
Rest/Brewery	50,000 SF	1.0 gpd/SF	50,000
Retail	130,000 SF	0.1 gpd/SF	13,000
Total			**235,980 gpd**
Total			**0.236 mgd**
Peak Q	**1.78(Qa)^0.92**		**0.472 mgd**

TETRA TECH, INC.
Infrastructure Services Group

July 29, 2002

Ms. Debbie Debow
City of Huntington Beach
Department of Public Works
2000 Main Street
Huntington Beach, CA 92648

Reference: Water Analysis for Pacific City

Dear Ms. Debow:

Tetra Tech has performed a water analysis for Pacific City, the proposed development in downtown Huntington Beach, as requested by the Water Division of the City of Huntington Beach's Department of Public Works (City). The purpose of the analysis is to determine what affects new water demands at the proposed development will have on the City's water distribution system and to determine what improvements, if any, will be required to maintain system performance criteria while servicing these new demands.

The analysis was conducted using the City's H2Onet hydraulic model of the water distribution system. Estimated average development demands were furnished by the Pacific City developer, Makar Properties (Developer). Estimated fire demands were furnished by the Huntington Beach Fire Department.

An existing 18-inch water main runs across the property. The water main proceeds east past Huntington Street and dead ends prior to reaching Beach Boulevard. The 18-inch water main is currently the sole water supply for water users located between Huntington Street and Beach Boulevard. These water users include the Water Front Hilton Hotel, a conference center, which is currently under construction, and the Hyatt Hotel. A project is currently underway to extend the 18-inch water main and connect it to a new 12-inch main that will run in Beach Boulevard. This project is scheduled to be complete prior to the start of construction at the Pacific City site.

The 18-inch main within the Pacific City site will need to be taken out of service by the Developer for some period of time to facilitate development construction. The effects on the water system of having the 18-inch water main out of service were also evaluated in the analysis.

Development Location and Description

The proposed development is a 31-acre site located in downtown Huntington Beach. The site is bordered by Atlanta Avenue to the north, Huntington Street to the east, Pacific Coast Highway to the south, and First Street to the west.

16241 Laguna Canyon Road, Suite 200, Irvine, CA 92618
Tel 949.727.7099 Fax 949.727.7097
www.tetratech.com

The property is zoned Residential High Density and Commercial Visitor. The proposed development will include 540 condominiums, a 400-room hotel, approximately 60,000 square feet of office space, approximately 50,000 square feet of restaurants and a brewery, and approximately 130,000 square feet of retail space.

Demand Estimates and Performance Criteria

The Developer estimated the average demand for the proposed development at 292 gallons per minute (gpm). City peaking factors of 1.6 and 2.5 were applied to this average demand to develop maximum-day and peak-hour demands of 467 gpm and 730 gpm, respectively. The Huntington Beach Fire Department estimated a fire flow requirement of 4,000 gpm using three consecutive fire hydrants while maintaining a minimum residual pressure of 20 psi at each of the three fire hydrants.

After proposed development demands are input into the hydraulic model, water pressures at the proposed development and within the immediate development area, i.e. the existing area surrounding the proposed development, must meet the following criteria:

Average-Day Demand:	Pressures in the immediate area of the proposed development must not drop by more than 2 psi. Pressures in the proposed development area including the proposed development must not drop below 50 psi.
Peak-Hour Demand:	Pressures in the immediate area of the proposed development must not drop by more than 4 psi. Pressures in the proposed development area including the proposed development must not drop below 40 psi.

The City of Huntington Beach Fire Department requires a 4,000-gpm fire flow at the proposed development using three consecutive hydrants while maintaining a minimum residual pressure of 20 psi at each of the three hydrants. Because a fire can occur on any given day, the required fire flow at the proposed development was run with maximum-day demands occurring throughout the water system.

The City of Huntington Beach Fire Department also requires a 4,000-gpm fire flow at 20 psi residual pressure at the Water Front Hilton Hotel, the Hyatt Hotel, and the conference center. However, it is assumed that a fire would not occur at all three establishments simultaneously. In evaluating water system performance with the 18-inch water main at the Pacific City site taken out of service, a 4,000 gpm fire was placed at the conference center, which will be in operation prior to construction beginning at the Pacific City site, during maximum-day demand. Maximum day demand at the Water Front Hilton Hotel, the conference center, and the Hyatt Hotel is estimated to be 100 gpm, 160 gpm, and 125 gpm, respectively.

The simulation was run with the new 18-inch water main east of Huntington Street connected to the new 12-inch main in Beach Boulevard. These pipelines are currently under construction.

Minimum Changes/Improvements Estimated by Developer

The Developer has estimated minimum water system improvements that will be required for the proposed development. These are minimum improvements and the results of the water system analysis may determine more extensive improvements. The minimum estimated improvements not including water pipelines inside the development are as follows:

- A new 18-inch water main on Pacific View Avenue.
- A new 12-inch water main in Huntington Street that will connect to an existing 12-inch water main in Atlanta Street and with an existing water main in Huntington Street as well as to the new 18-inch water main in Pacific View Avenue.
- A new 8-inch water main in First Street that will connect to the existing 12-inch water main in Atlanta Avenue and with the new 18-inch water main in Pacific View Avenue.
- A new 12-inch water main in First Street that will connect to a new 12-inch water main in Pacific Coast Highway and with the new 18-inch water main in Pacific View Avenue.
- A new 12-inch water main in Pacific Coast Highway that will connect with the new 12-inch water main in First Street and with an existing 12-inch water main in Huntington Street.

The initial simulations were run with these minimum improvements in place with one exception. The Developer-proposed 8-inch water main in First Street between Atlanta Avenue and Pacific View Avenue was upsized to a 12-inch water main. This water main must serve fire flow to the portion of the development east of First Street and north of Pacific View Avenue and a 12-inch water main is warranted. Also, this main is located to the east of First Street on the "Water Line Exhibit for Pacific City" prepared for the Developer by their Engineer, Hunsaker & Associates. It is recommended that this main should be located within the public right-of-way on First Street.

Analysis Methodology

For the analysis with the 18-inch water main at the Pacific City site taken out of service, the model was set up as shown on Figure 1. It is recommended that the proposed 12-inch water main in Huntington Street be constructed and put into service prior to taking the 18-inch water main out of service. Otherwise, only the existing 12-inch water main on Huntington Street would be available to serve water to the remaining 18-inch water main east of Huntington Street. As shown on Figure 1, the simulation was run with the proposed 12-inch water main on Huntington Street in service.

For the "normal" average-day demand, peak-hour demand, and maximum-day demand plus fire flow simulations the minimum improvements as estimated by the Developer (with the lone exception on First Street) were input into the computer model as shown on Figures 2A and 2B.

In making a model simulation, if the pressure requirements could not be met with only these minimum improvements, then additional pipeline improvements would be made until the pressure criteria was achieved.

Analysis Results

Maximum-Day Demand with Fire Demand at the Hyatt Hotel and with 18-inch Water Main Out:

A simulation was run with the 18-inch water main at the Pacific City site out of service and the proposed new 12-inch water main in Huntington Street in service. Maximum-day demands were located throughout the system and the estimated fire-flow demand of 4,000 gpm was located at the Conference Center. The results showed a residual pressure of approximately 52 psi at the conference center fire hydrant node, which actually symbolizes three consecutive fire hydrants at that location. Pressures at the Hyatt and Hilton Hotels were approximately 51 psi and 53 psi, respectively. Other pressures in the immediate area ranged from 50 to 68 psi. The pressure requirement of a 20-psi residual pressure at the conference center fire hydrant node was met without the need for additional piping improvements.

Average-Day Demand:

Existing pressures in the area of the proposed development during average-day demand range from approximately 63 to 79 psi. A simulation was run with average-day demands located throughout the system and the estimated average-day demand of 292 gpm placed at the proposed development site as shown on Figures 2A and 2B. The results showed pressures of approximately 65 to 76 psi at the proposed development site, with other pressures in the immediate area ranging from 63 to 78 psi, i.e. no noticeable drop from existing pressures. All pressure requirements were met without the need for additional piping improvements.

Peak-Hour Demand:

Existing pressures in the area of the proposed development during peak-hour demand range from approximately 53 to 70 psi. A simulation was run with peak-hour demands located throughout the existing system and the estimated peak hour demand of 730 gpm placed at the proposed development site as shown on Figures 2A and 2B. The results showed pressures of approximately 54 to 64 psi at the proposed development site, with other pressures in the immediate area ranging from 49 to 68 psi, i.e. a drop of about 2 to 4 psi. All pressure requirements were met without the need for additional piping improvements.

Maximum-Day Demand with Fire Demand at the Proposed Development:

A simulation was run with maximum-day demands located throughout the system and the estimated fire-flow demand of 4,000 gpm allocated at the proposed development on the proposed 12-inch pipeline on Pacific Coast Highway (at node 8 on Figure 2B, which represents three consecutive fire hydrants). Maximum-day demand was also located at the development as shown on Figures 2A and 2B. The results showed a residual pressure of approximately 57 psi at the fire flow node (during normal maximum-day demand the pressure would be approximately 70 psi), with other pressures in

the immediate area ranging from approximately 49 to 68 psi. The pressure requirement of a 20-psi residual pressure at the fire flow hydrant was met without the need for additional piping improvements.

Recommendations

We recommend that the developer be required to design and construct the following improvements to meet the demands of his development:

- A new 18-inch water main on Pacific View Avenue between First Street and Huntington Street.
- A new 12-inch water main in Huntington Street that will connect to an existing 12-inch water main in Atlanta Street and with an existing water main in Huntington Street as well as to the new 18-inch water main in Pacific View Avenue.
- A new 12-inch water main in First Street (in the public right-of-way) that will connect to the existing 12-inch water main in Atlanta Avenue and with the new 18-inch water main in Pacific View Avenue.
- A new 12-inch water main in First Street that will connect to a new 12-inch water main in Pacific Coast Highway and with the new 18-inch water main in Pacific View Avenue.
- A new 12-inch water main in Pacific Coast Highway that will connect with the new 12-inch water main in First Street and with an existing 12-inch water main in Huntington Street.
- The proposed 12-inch water main in Huntington Street should be constructed and put into service prior to taking the 18-inch water main out of service.

Please give me a call if you have any questions.

Sincerely,

Robert Brandom, P.E.
Project Manager

RB/tlc
J:\0600\0015\l001rgb.doc(300)

Attachments

City of Huntington Beach Domestic Water System
Pacific City Development Hydraulic Modeling Analysis
Existing System - Maximum Day Demand w/ 4,000 gpm Fire Flow

18" MAIN OUT OF SERVICE

Number of Pipes	18767
Number of Nodes	17459
Number of Tanks	5
Number of Pumps	8
Number of Valves	7
Headloss Formula	Hazen-Williams
Hydraulic Timestep	1.00 hrs
Hydraulic Accuracy	0.010000
Maximum Trials	100
Quality Analysis	None
Specific Gravity	1.00
Kinematic Viscosity	1.10e-005 sq ft/sec
Chemical Diffusivity	1.30e-008 sq ft/sec
Vapor Pressure	8.40e-001 ft
Total Duration	0.00 hrs

Hydraulic Convergence at 00:00 hrs:
Trial 1 : 1.345757 accuracy
PRV 30028 switched from OPEN to ACTIVE
FCV 30062 switched from ACTIVE to OPEN
FCV 30064 switched from ACTIVE to OPEN
FCV 30082 switched from ACTIVE to OPEN
FCV 30084 switched from ACTIVE to OPEN
FCV 30090 switched from ACTIVE to OPEN
Trial 2 : 0.849369 accuracy
PRV 30028 switched from ACTIVE to OPEN
FCV 30064 switched from OPEN to ACTIVE
FCV 30084 switched from OPEN to ACTIVE
Pipe 190667 switched from OPEN to CLOSED
Pipe 190671 switched from OPEN to CLOSED
Trial 3 : 2.031191 accuracy
PRV 30028 switched from OPEN to CLOSED
FCV 30064 switched from ACTIVE to OPEN
FCV 30084 switched from ACTIVE to OPEN
Trial 4 : 0.568758 accuracy
FCV 30084 switched from OPEN to ACTIVE
Trial 5 : 0.115807 accuracy
PRV 30028 switched from CLOSED to ACTIVE
FCV 30062 switched from OPEN to ACTIVE
Trial 6 : 0.049269 accuracy
FCV 30062 switched from ACTIVE to OPEN
Pipe 190667 switched from CLOSED to OPEN
Pipe 190701 switched from OPEN to CLOSED
Pump 50127 switched from OPEN to CLOSED

```
            Pump 50129 switched from OPEN to CLOSED
            Pump 50131 switched from OPEN to CLOSED
Trial 7   : 1.018394 accuracy
            FCV  30062 switched from OPEN to ACTIVE
Trial 8   : 2.767167 accuracy
            PRV  30028 switched from ACTIVE to CLOSED
            CV   12076 switched from CLOSED to OPEN
            CV   15809 switched from CLOSED to OPEN
            CV   15878 switched from CLOSED to OPEN
            CV   15920 switched from CLOSED to OPEN
            CV   190323 switched from CLOSED to OPEN
            Pipe 190667 switched from OPEN to CLOSED
            Pipe 190701 switched from CLOSED to OPEN
            CV   3175 switched from CLOSED to OPEN
            CV   3312 switched from CLOSED to OPEN
            Pump 50049 switched from OPEN to CLOSED
            Pump 50127 switched from CLOSED to OPEN
            Pump 50129 switched from CLOSED to OPEN
            Pump 50131 switched from CLOSED to OPEN
Trial 9   : 1.973654 accuracy
            FCV  30062 switched from ACTIVE to OPEN
            FCV  30084 switched from ACTIVE to OPEN
Trial 10  : 1.177085 accuracy
            FCV  30084 switched from OPEN to ACTIVE
            CV   15809 switched from OPEN to CLOSED
            CV   15878 switched from OPEN to CLOSED
            CV   15920 switched from OPEN to CLOSED
            CV   190323 switched from OPEN to CLOSED
            Pipe 190667 switched from CLOSED to OPEN
            Pipe 190701 switched from OPEN to CLOSED
            Pump 50049 switched from CLOSED to OPEN
            Pump 50127 switched from OPEN to CLOSED
            Pump 50129 switched from OPEN to CLOSED
            Pump 50131 switched from OPEN to CLOSED
Trial 11  : 2.051219 accuracy
            FCV  30064 switched from OPEN to ACTIVE
            FCV  30084 switched from ACTIVE to OPEN
Trial 12  : 1.251935 accuracy
            FCV  30084 switched from OPEN to ACTIVE
Trial 13  : 1.157259 accuracy
            PRV  30028 switched from CLOSED to OPEN
Trial 14  : 1.144264 accuracy
            PRV  30028 switched from OPEN to ACTIVE
            FCV  30064 switched from ACTIVE to OPEN
            FCV  30084 switched from ACTIVE to OPEN
Trial 15  : 1.030890 accuracy
            FCV  30084 switched from OPEN to ACTIVE
Trial 16  : 1.776843 accuracy
            FCV  30062 switched from OPEN to ACTIVE
Trial 17  : 0.530704 accuracy
Trial 18  : 0.304880 accuracy
```

```
    Trial 19 : 0.148272 accuracy
               PRV  30028 switched from ACTIVE to OPEN
    Trial 20 : 0.089151 accuracy
    Trial 21 : 0.026611 accuracy
    Trial 22 : 0.006974 accuracy
               CV   12076 switched from OPEN to CLOSED
               CV   3175 switched from OPEN to CLOSED
               CV   3312 switched from OPEN to CLOSED
               Pump 50127 switched from CLOSED to OPEN
               Pump 50129 switched from CLOSED to OPEN
               Pump 50131 switched from CLOSED to OPEN
    Trial 23 : 0.101651 accuracy
               PRV  30028 switched from OPEN to ACTIVE
               FCV  30062 switched from ACTIVE to OPEN
               FCV  30084 switched from ACTIVE to OPEN
    Trial 24 : 0.635701 accuracy
               FCV  30062 switched from OPEN to ACTIVE
               FCV  30084 switched from OPEN to ACTIVE
    Trial 25 : 1.721811 accuracy
    Trial 26 : 0.000713 accuracy
               Pipe 190701 switched from CLOSED to OPEN
    Trial 27 : 0.002253 accuracy
    Trial 28 : 0.000002 accuracy

  Hydraulic Status:
  ----------------------------------------------------------------------
  Balanced                    28 trials (0.000002 accuracy) at 0.0022 g
pm
  Flow Supplied               28400.00 gpm
  Flow Demanded               39117.23 gpm
  Flow Stored                 -10718.23 gpm
  Tank 20107                  Closed   (166.32 ft level)
  Tank 20109                  Emptying (120.12 ft level)
  Tank 20111                  Emptying (173.25 ft level)
  Tank 20115                  Emptying (173.25 ft level)
  Tank 20117                  Closed   (120.12 ft level)
  Pipe 10538                  Closed
  CV   12076                  Closed
  CV   15809                  Closed
  CV   15878                  Closed
  CV   15920                  Closed
  CV   190323                 Closed
  Pipe 190675                 Closed
  Pipe 190699                 Closed
  Pipe 3151                   Closed
  CV   3175                   Closed
  CV   3312                   Closed
  Pipe 3559                   Closed
  Pipe 4815                   Closed
  Pump 50043                  Closed (0.00 setting)
  Pump 50045                  Closed (0.00 setting)
```

```
  Pump 50047                    Closed (0.00 setting)
  Pump 50049                    Open   (1.00 setting)
  Pump 50051                    Closed (0.00 setting)
  Pump 50127                    Open   (1.00 setting)
  Pump 50129                    Open   (1.00 setting)
  Pump 50131                    Open   (1.00 setting)
  PRV  30028                    Active (75.00 psi setting)
  PRV  30056                    Closed
  FCV  30062                    Active (1.00 gpm setting)
  FCV  30064                    Cannot deliver flow (12000.00 gpm setting
)
  FCV  30082                    Cannot deliver flow (1700.00 gpm setting)
  FCV  30084                    Active (1.00 gpm setting)
  FCV  30090                    Cannot deliver flow (10000.00 gpm setting
)

  * Warning: FCV  30064 - Cannot deliver flow at 00:00 hrs.
  * Warning: FCV  30082 - Cannot deliver flow at 00:00 hrs.
  * Warning: FCV  30090 - Cannot deliver flow at 00:00 hrs.


 ****************************************
    Warning/Error Messages during Run
 ****************************************


** Retrieving Network Data **

** Simulating Network Hydraulics **
at time:  00:00
* Warning: FCV  30064 - Cannot deliver flow at 00:00 hrs.
* Warning: FCV  30082 - Cannot deliver flow at 00:00 hrs.
* Warning: FCV  30090 - Cannot deliver flow at 00:00 hrs.

Warnings exist.  Please check Output Report for details
```

Existing System - Max. Day Demand w/ Fire - Tank Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
[redacted]	20107	0.00	22.91	189.23	72.10
[redacted]	20109	-10,716.23	61.50	181.62	52.07
[redacted]	20111	-1.00	61.13	234.38	75.10
[redacted]	20115	-1.00	60.00	233.25	75.10
[redacted]	20117	0.00	60.00	180.12	52.07

Existing System - Max. Day Demand w/ Fire Flow - Junction Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
1	17770	5.45	11.95	127.86	50.25
2	17769	5.45	11.92	127.86	50.26
3	190744	0.00	9.50	125.47	50.27
4	17904	5.45	9.49	125.66	50.36
5	17905	5.45	9.41	125.68	50.40
6	17908	5.45	9.33	125.66	50.43
7	17820	5.45	9.87	126.30	50.47
8	17910	5.45	9.28	125.71	50.47
9	17914	5.45	9.24	125.68	50.48
10	17913	5.45	9.25	125.74	50.50
11	17920	5.45	9.14	125.71	50.54
12	190746	130.45	9.00	125.65	50.57
13	17928	5.45	9.05	125.74	50.59
14	17054	0.00	30.27	147.24	50.70
15	17053	0.00	29.63	146.78	50.79
16	17049	0.00	29.57	146.78	50.81
17	17810	5.45	8.99	126.54	50.96
18	17048	0.00	30.25	147.91	51.01
19	17057	0.00	26.44	144.33	51.11
20	17803	0.00	8.61	126.54	51.12
21	17087	0.00	22.86	141.23	51.32
22	17799	4,160.00	5.86	125.22	51.74
23	17774	5.45	6.32	126.28	52.00
24	17776	5.45	6.31	126.28	52.01
25	17772	0.00	5.12	125.48	52.18
26	17714	100.00	4.28	125.96	52.75
27	18083	5.45	6.01	128.16	52.95
28	17011	0.00	29.90	152.19	53.01
29	18081	5.45	5.51	128.16	53.17
30	18200	5.45	5.44	128.45	53.33
31	18197	5.45	5.16	128.45	53.45
32	18214	0.00	4.97	128.49	53.55
33	17009	0.00	31.57	155.12	53.56
34	17077	0.00	29.02	152.58	53.57
35	17068	0.00	28.98	152.58	53.58
36	16996	0.00	31.01	155.12	53.80
37	190742	0.00	1.50	126.07	54.00
38	17687	0.00	1.54	126.22	54.05
39	17682	0.00	1.46	126.22	54.08
40	18252	0.00	4.45	129.51	54.21

Existing System - Max. Day Demand w/ Fire Flow - Junction Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
41	18241	0.00	6.50	131.58	54.22
42	18253	0.00	4.45	129.54	54.23
43	18233	5.45	6.14	131.58	54.38
44	18279	0.00	6.74	132.21	54.39
45	18240	0.00	3.90	129.51	54.45
46	18256	0.00	6.50	132.21	54.50
47	18255	0.00	6.50	132.21	54.50
48	18254	0.00	6.50	132.21	54.50
49	17281	2.24	26.50	153.87	55.22
50	17279	0.00	26.50	153.87	55.22
51	18238	0.00	6.52	134.11	55.31
52	18250	0.00	6.50	134.11	55.32
53	17356	0.00	26.48	154.42	55.46
54	17401	2.24	25.41	154.24	55.85
55	17407	2.24	25.33	154.24	55.88
56	17424	2.24	24.84	154.14	56.05
57	17321	0.00	26.07	155.49	56.11
58	17310	0.00	26.07	155.49	56.11
59	18171	0.00	6.81	136.49	56.22
60	18170	0.00	6.80	136.49	56.22
61	17434	2.24	24.27	154.04	56.26
62	17445	2.24	24.07	154.04	56.34
63	17457	2.24	23.90	154.03	56.41
64	17479	0.00	24.40	154.55	56.42
65	17408	0.00	25.20	155.49	56.48
66	17490	0.00	24.14	154.55	56.53
67	17406	0.00	24.13	154.88	56.68
68	17415	0.00	24.20	155.49	56.92
69	17517	0.00	21.58	153.17	57.05
70	18122	0.00	6.74	138.42	57.08
71	17412	0.00	23.12	154.88	57.12
72	18110	0.00	6.76	138.57	57.14
73	18099	5.45	6.58	138.42	57.15
74	18101	0.00	6.69	138.57	57.17
75	17491	0.00	22.08	154.03	57.20
76	18042	0.00	7.51	140.45	57.63
77	18041	0.00	7.44	140.45	57.66
78	17990	0.00	9.35	142.92	57.90
79	17991	0.00	8.70	142.46	57.98
80	17989	0.00	8.63	142.46	58.01

Existing System - Max. Day Demand w/ Fire Flow - Junction Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
81	17544	0.00	19.27	153.15	58.04
82	17988	0.00	9.00	142.92	58.06
83	17543	0.00	19.19	153.17	58.08
84	17122	0.00	29.41	163.41	58.09
85	17144	0.00	29.25	163.41	58.16
86	17869	0.00	11.10	146.41	58.66
87	17930	0.00	9.00	144.33	58.67
88	17934	0.00	9.00	144.33	58.67
89	17875	0.00	11.07	146.41	58.67
90	17832	0.00	11.36	147.21	58.89
91	17559	0.00	16.85	152.88	58.97
92	17560	0.00	16.49	152.86	59.12
93	17304	0.00	26.52	163.41	59.34
94	17305	0.00	26.50	163.41	59.35
95	17307	0.00	26.47	163.41	59.36
96	17768	0.00	11.44	149.02	59.64
97	17771	0.00	10.82	149.02	59.91
98	17624	0.00	13.00	151.48	60.03
99	17635	0.00	12.00	151.48	60.47
100	17493	0.00	15.91	155.49	60.51
101	17570	0.00	13.02	152.88	60.63
102	17506	0.00	15.17	155.49	60.83
103	17492	0.00	10.01	153.73	62.30
104	17555	0.00	8.38	152.86	62.63
105	17577	0.00	-4.42	144.12	64.39
106	17580	0.00	-4.45	144.12	64.41
107	17567	0.00	4.71	155.49	65.37
108	17573	0.00	4.70	155.49	65.37
109	17461	0.00	2.46	154.03	65.71
110	17497	0.00	0.71	153.73	66.33
111	17669	0.00	1.50	155.49	66.76
112	17452	0.00	-3.75	154.03	68.40

City of Huntington Beach Domestic Water System
Pacific City Development Hydraulic Modeling Analysis
Existing System - Average Day Demand

Number of Pipes	18766
Number of Nodes	17459
Number of Tanks	5
Number of Pumps	8
Number of Valves	7
Headloss Formula	Hazen-Williams
Hydraulic Timestep	1.00 hrs
Hydraulic Accuracy	0.010000
Maximum Trials	100
Quality Analysis	None
Specific Gravity	1.00
Kinematic Viscosity	1.10e-005 sq ft/sec
Chemical Diffusivity	1.30e-008 sq ft/sec
Vapor Pressure	8.40e-001 ft
Total Duration	0.00 hrs

Hydraulic Convergence at 00:00 hrs:
Trial 1 : 2.244286 accuracy
PRV 30028 switched from OPEN to ACTIVE
FCV 30062 switched from ACTIVE to OPEN
FCV 30084 switched from ACTIVE to OPEN
Trial 2 : 0.835957 accuracy
FCV 30084 switched from OPEN to ACTIVE
Pipe 190667 switched from OPEN to CLOSED
Pipe 190671 switched from OPEN to CLOSED
Trial 3 : 3.135891 accuracy
Trial 4 : 0.023645 accuracy
Trial 5 : 0.003256 accuracy

Hydraulic Status:

Balanced 5 trials (0.003256 accuracy) at 0.0022 gpm
Flow Supplied 20300.00 gpm
Flow Demanded 22011.25 gpm
Flow Stored -1712.24 gpm
Tank 20107 Closed (166.32 ft level)
Tank 20109 Emptying (120.12 ft level)
Tank 20111 Emptying (173.25 ft level)
Tank 20115 Closed (173.25 ft level)
Tank 20117 Closed (120.12 ft level)
Pipe 10538 Closed
CV 12076 Closed
CV 15809 Closed

CV	15878	Closed
CV	15920	Closed
CV	190323	Closed
Pipe	190675	Closed
Pipe	190699	Closed
Pipe	3151	Closed
CV	3175	Closed
CV	3312	Closed
Pump	50043	Closed (0.00 setting)
Pump	50045	Closed (0.00 setting)
Pump	50047	Closed (0.00 setting)
Pump	50049	Open (1.00 setting)
Pump	50051	Closed (0.00 setting)
Pump	50127	Open (1.00 setting)
Pump	50129	Open (1.00 setting)
Pump	50131	Open (1.00 setting)
PRV	30028	Active (75.00 psi setting)
PRV	30056	Closed
FCV	30062	Cannot deliver flow (1.00 gpm setting)
FCV	30064	Open
FCV	30082	Open
FCV	30084	Active (1.00 gpm setting)
FCV	30090	Open

* Warning: FCV 30062 - Cannot deliver flow at 00:00 hrs.

****
Warning/Error Messages during Run
****

** Retrieving Network Data **

** Simulating Network Hydraulics **
at time: 00:00
* Warning: FCV 30062 - Cannot deliver flow at 00:00 hrs.

Warnings exist. Please check Output Report for details

Existing System - Average Day Demand - Tank Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
1	2010	0.00	22.91	189.23	72.10
2	2009	-1,711.24	61.50	181.62	52.07
3	2011	-1.00	61.13	234.38	75.10
4	2015	0.00	60.00	233.25	75.10
5	2017	0.00	60.00	180.12	52.07

Existing System - Average Day Demand - Junction Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
1	17009	0.00	31.57	177.30	63.17
2	16996	0.00	31.01	177.30	63.41
3	17054	0.00	30.27	176.74	63.50
4	17048	0.00	30.25	176.76	63.51
5	17122	0.00	29.41	176.11	63.59
6	17144	0.00	29.25	176.11	63.66
7	17053	0.00	29.63	176.73	63.77
8	17049	0.00	29.57	176.73	63.79
9	17011	0.00	29.90	177.09	63.81
10	17077	0.00	29.02	177.12	64.20
11	17068	0.00	28.98	177.12	64.22
12	17304	0.00	26.52	176.09	64.84
13	17305	0.00	26.50	176.09	64.85
14	17307	0.00	26.47	176.09	64.86
15	17310	0.00	26.07	176.09	65.03
16	17321	0.00	26.07	176.09	65.03
17	17057	0.00	26.44	176.64	65.11
18	17279	0.00	26.50	177.22	65.34
19	17281	1.40	26.50	177.22	65.34
20	17356	0.00	26.48	177.26	65.36
21	17408	0.00	25.20	176.08	65.40
22	17401	1.40	25.41	177.25	65.82
23	17415	0.00	24.20	176.08	65.84
24	17407	1.40	25.33	177.25	65.86
25	17424	1.40	24.84	177.25	66.07
26	17479	0.00	24.40	177.27	66.27
27	17434	1.40	24.27	177.24	66.31
28	17490	0.00	24.14	177.27	66.38
29	17406	0.00	24.13	177.28	66.39
30	17445	1.40	24.07	177.24	66.40
31	17457	1.40	23.90	177.24	66.47
32	17087	0.00	22.86	176.53	66.62
33	17412	0.00	23.12	177.28	66.83
34	17491	0.00	22.08	177.24	67.26
35	17517	0.00	21.58	177.20	67.46
36	17544	0.00	19.27	177.20	68.46
37	17543	0.00	19.19	177.20	68.50
38	17493	0.00	15.91	176.06	69.43
39	17559	0.00	16.85	177.18	69.51
40	17560	0.00	16.49	177.18	69.66

Existing System - Average Day Demand - Junction Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
41	17506	0.00	15.17	176.06	69.75
42	17624	0.00	13.00	177.11	71.14
43	17770	3.41	11.95	176.10	71.16
44	17570	0.00	13.02	177.18	71.17
45	17769	3.41	11.92	176.10	71.17
46	17635	0.00	12.00	177.11	71.58
47	17832	0.00	11.36	176.90	71.76
48	17768	0.00	11.44	176.99	71.77
49	17869	0.00	11.10	176.86	71.86
50	17875	0.00	11.07	176.86	71.87
51	17820	3.41	9.87	176.04	72.03
52	17771	0.00	10.82	176.99	72.04
53	190744	0.00	9.50	176.02	72.18
54	17904	3.41	9.49	176.01	72.19
55	17905	3.41	9.41	176.01	72.22
56	17908	3.41	9.33	176.01	72.26
57	17910	3.41	9.28	176.01	72.28
58	17913	3.41	9.25	176.01	72.29
59	17914	3.41	9.24	176.01	72.29
60	17920	3.41	9.14	176.01	72.34
61	17928	3.41	9.05	176.01	72.38
62	190746	81.41	9.00	176.01	72.40
63	17810	3.41	8.99	176.05	72.42
64	17492	0.00	10.01	177.23	72.49
65	17990	0.00	9.35	176.68	72.54
66	17803	0.00	8.61	176.05	72.58
67	17988	0.00	9.00	176.68	72.69
68	17930	0.00	9.00	176.76	72.72
69	17934	0.00	9.00	176.76	72.72
70	17991	0.00	8.70	176.66	72.81
71	17989	0.00	8.63	176.66	72.84
72	17555	0.00	8.38	177.18	73.18
73	18042	0.00	7.51	176.56	73.28
74	18041	0.00	7.44	176.56	73.31
75	18279	0.00	6.74	176.16	73.44
76	18171	0.00	6.81	176.37	73.50
77	18170	0.00	6.80	176.37	73.51
78	18241	0.00	6.50	176.13	73.53
79	18254	0.00	6.50	176.16	73.55
80	18255	0.00	6.50	176.16	73.55

Existing System - Average Day Demand - Junction Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
81	18256	0.00	6.50	176.16	73.55
82	18110	0.00	6.76	176.47	73.57
83	17774	3.41	6.32	176.04	73.57
84	18122	0.00	6.74	176.46	73.57
85	17776	3.41	6.31	176.04	73.58
86	18238	0.00	6.52	176.25	73.58
87	18250	0.00	6.50	176.25	73.59
88	18101	0.00	6.69	176.47	73.60
89	18099	3.41	6.58	176.46	73.64
90	18083	3.41	6.01	175.99	73.69
91	18233	3.41	6.14	176.13	73.69
92	17799	100.00	5.86	176.02	73.76
93	18081	3.41	5.51	175.99	73.91
94	18200	3.41	5.44	175.99	73.93
95	18197	3.41	5.16	175.99	74.05
96	17772	0.00	5.12	176.02	74.09
97	18214	0.00	4.97	175.99	74.14
98	17567	0.00	4.71	176.05	74.28
99	17573	0.00	4.70	176.05	74.28
100	18253	0.00	4.45	175.92	74.33
101	18252	0.00	4.45	175.92	74.33
102	17714	63.00	4.28	176.03	74.45
103	18240	0.00	3.90	175.92	74.57
104	17687	0.00	1.54	176.04	75.64
105	190742	0.00	1.50	176.00	75.65
106	17669	0.00	1.50	176.04	75.66
107	17682	0.00	1.46	176.04	75.68
108	17461	0.00	2.46	177.24	75.77
109	17497	0.00	0.71	177.23	76.52
110	17452	0.00	-3.75	177.24	78.46
111	17577	0.00	-4.42	176.81	78.56
112	17580	0.00	-4.45	176.81	78.58

City of Huntington Beach Domestic Water System
Pacific City Development Hydraulic Modeling Analysis
Existing System - Peak Hour Demand

Number of Pipes	18766
Number of Nodes	17459
Number of Tanks	5
Number of Pumps	8
Number of Valves	7
Headloss Formula	Hazen-Williams
Hydraulic Timestep	1.00 hrs
Hydraulic Accuracy	0.010000
Maximum Trials	100
Quality Analysis	None
Specific Gravity	1.00
Kinematic Viscosity	1.10e-005 sq ft/sec
Chemical Diffusivity	1.30e-008 sq ft/sec
Vapor Pressure	8.40e-001 ft
Total Duration	0.00 hrs

Hydraulic Convergence at 00:00 hrs:
Trial 1 : 1.591682 accuracy
PRV 30028 switched from OPEN to ACTIVE
FCV 30062 switched from ACTIVE to OPEN
FCV 30084 switched from ACTIVE to OPEN
Trial 2 : 0.728268 accuracy
FCV 30062 switched from OPEN to ACTIVE
FCV 30084 switched from OPEN to ACTIVE
Trial 3 : 1.784816 accuracy
Trial 4 : 0.013467 accuracy
Trial 5 : 0.001559 accuracy

Hydraulic Status:

Balanced 5 trials (0.001559 accuracy) at 0.0022 gpm
Flow Supplied 35646.00 gpm
Flow Demanded 55147.69 gpm
Flow Stored -19502.69 gpm
Tank 20107 Emptying (166.32 ft level)
Tank 20109 Emptying (120.12 ft level)
Tank 20111 Emptying (173.25 ft level)
Tank 20115 Emptying (173.25 ft level)
Tank 20117 Emptying (120.12 ft level)
Pipe 10538 Closed
CV 12076 Closed
CV 15809 Closed
CV 15878 Closed

CV	15920	Closed
CV	190323	Closed
Pipe	190675	Closed
Pipe	3151	Closed
CV	3175	Closed
CV	3312	Closed
Pump	50043	Closed (0.00 setting)
Pump	50045	Closed (0.00 setting)
Pump	50047	Closed (0.00 setting)
Pump	50049	Open (1.00 setting)
Pump	50051	Closed (0.00 setting)
Pump	50127	Open (1.00 setting)
Pump	50129	Open (1.00 setting)
Pump	50131	Open (1.00 setting)
PRV	30028	Active (75.00 psi setting)
PRV	30056	Closed
FCV	30062	Active (1.00 gpm setting)
FCV	30064	Open
FCV	30082	Active (4500.00 gpm setting)
FCV	30084	Active (1.00 gpm setting)
FCV	30090	Open

Existing System - Peak Hour Demand - Tank Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
1	20107	-754.60	22.91	189.23	72.10
2	20109	-14,246.09	61.50	181.62	52.07
3	20111	-1.00	61.13	234.38	75.10
4	20115	-1.00	60.00	233.25	75.10
5	20E7??	-4,500.00	60.00	180.12	52.07

Existing System - Peak Hour Demand - Junction Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
1	17122	0.00	29.41	151.79	53.05
2	17144	0.00	29.25	151.79	53.12
3	17054	0.00	30.27	154.25	53.74
4	17048	0.00	30.25	154.29	53.77
5	17053	0.00	29.63	154.18	53.99
6	17049	0.00	29.57	154.18	54.02
7	17304	0.00	26.52	151.71	54.27
8	17009	0.00	31.57	156.76	54.27
9	17305	0.00	26.50	151.71	54.28
10	17307	0.00	26.47	151.71	54.29
11	17321	0.00	26.07	151.69	54.46
12	17310	0.00	26.07	151.69	54.46
13	16996	0.00	31.01	156.76	54.51
14	17011	0.00	29.90	155.85	54.60
15	17408	0.00	25.20	151.64	54.81
16	17077	0.00	29.02	155.99	55.04
17	17068	0.00	28.98	155.99	55.06
18	17057	0.00	26.44	153.83	55.22
19	17415	0.00	24.20	151.64	55.24
20	17279	0.00	26.50	156.44	56.33
21	17281	3.49	26.50	156.44	56.33
22	17356	0.00	26.48	156.63	56.42
23	17087	0.00	22.86	153.41	56.60
24	17401	3.49	25.41	156.60	56.87
25	17407	3.49	25.33	156.60	56.90
26	17424	3.49	24.84	156.58	57.11
27	17479	0.00	24.40	156.67	57.34
28	17434	3.49	24.27	156.56	57.35
29	17445	3.49	24.07	156.56	57.43
30	17490	0.00	24.14	156.67	57.45
31	17406	0.00	24.13	156.73	57.48
32	17457	3.49	23.90	156.56	57.51
33	17412	0.00	23.12	156.73	57.92
34	17491	0.00	22.08	156.55	58.29
35	17517	0.00	21.58	156.37	58.43
36	17493	0.00	15.91	151.59	58.82
37	17506	0.00	15.17	151.59	59.14
38	17544	0.00	19.27	156.37	59.43
39	17543	0.00	19.19	156.37	59.47
40	17559	0.00	16.85	156.31	60.46

Existing System - Peak Hour Demand - Junction Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
41	17770	8.51	11.95	151.72	60.59
42	17769	8.51	11.92	151.72	60.60
43	17560	0.00	16.49	156.31	60.61
44	17820	8.51	9.87	151.47	61.38
45	17904	8.51	9.49	151.34	61.49
46	190744	0.00	9.50	151.37	61.50
47	17905	8.51	9.41	151.34	61.53
48	17908	8.51	9.33	151.34	61.56
49	17910	8.51	9.28	151.34	61.58
50	17913	8.51	9.25	151.34	61.59
51	17914	8.51	9.24	151.34	61.60
52	17920	8.51	9.14	151.34	61.64
53	17928	8.51	9.05	151.34	61.68
54	190746	203.51	9.00	151.33	61.70
55	17810	8.51	8.99	151.50	61.78
56	17803	0.00	8.61	151.50	61.94
57	17624	0.00	13.00	156.02	62.00
58	17570	0.00	13.02	156.31	62.12
59	17832	0.00	11.36	155.11	62.32
60	17869	0.00	11.10	154.94	62.35
61	17875	0.00	11.07	154.94	62.37
62	17635	0.00	12.00	156.02	62.43
63	17768	0.00	11.44	155.49	62.45
64	17771	0.00	10.82	155.49	62.72
65	17990	0.00	9.35	154.20	62.79
66	17774	8.51	6.32	151.46	62.92
67	17776	8.51	6.31	151.46	62.92
68	17988	0.00	9.00	154.20	62.95
69	18279	0.00	6.74	152.01	62.97
70	18083	8.51	6.01	151.30	62.98
71	18241	0.00	6.50	151.88	63.02
72	17991	0.00	8.70	154.10	63.03
73	17989	0.00	8.63	154.10	63.06
74	17930	0.00	9.00	154.50	63.07
75	17934	0.00	9.00	154.50	63.07
76	18256	0.00	6.50	152.01	63.08
77	18255	0.00	6.50	152.01	63.08
78	18254	0.00	6.50	152.01	63.08
79	17799	250.00	5.86	151.37	63.08
80	18233	8.51	6.14	151.88	63.18

Existing System - Peak Hour Demand - Junction Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
81	18081	8.51	5.51	151.30	63.20
82	18200	8.51	5.44	151.30	63.23
83	18238	0.00	6.52	152.39	63.23
84	18250	0.00	6.50	152.39	63.24
85	18171	0.00	6.81	152.86	63.31
86	18170	0.00	6.80	152.86	63.32
87	18197	8.51	5.16	151.30	63.35
88	18042	0.00	7.51	153.68	63.36
89	18041	0.00	7.44	153.68	63.39
90	17772	0.00	5.12	151.39	63.41
91	18214	0.00	4.97	151.30	63.43
92	17492	0.00	10.01	156.49	63.50
93	18122	0.00	6.74	153.25	63.51
94	18110	0.00	6.76	153.28	63.52
95	18101	0.00	6.69	153.28	63.55
96	18253	0.00	4.45	151.10	63.57
97	18252	0.00	4.45	151.10	63.57
98	18099	8.51	6.58	153.25	63.58
99	17567	0.00	4.71	151.53	63.65
100	17573	0.00	4.70	151.53	63.65
101	17714	158.00	4.28	151.43	63.79
102	18240	0.00	3.90	151.10	63.81
103	17555	0.00	8.38	156.31	64.13
104	190742	0.00	1.50	151.33	64.95
105	17687	0.00	1.54	151.46	64.99
106	17669	0.00	1.50	151.46	65.01
107	17682	0.00	1.46	151.46	65.02
108	17461	0.00	2.46	156.55	66.80
109	17497	0.00	0.71	156.49	67.53
110	17577	0.00	-4.42	154.73	68.99
111	17580	0.00	-4.45	154.73	69.00
112	17452	0.00	-3.75	156.55	69.49

City of Huntington Beach Domestic Water System
Pacific City Development Hydraulic Modeling Analysis
Proposed System - Average Day Demand

Number of Pipes	18773
Number of Nodes	17463
Number of Tanks	5
Number of Pumps	8
Number of Valves	7
Headloss Formula	Hazen-Williams
Hydraulic Timestep	1.00 hrs
Hydraulic Accuracy	0.010000
Maximum Trials	100
Quality Analysis	None
Specific Gravity	1.00
Kinematic Viscosity	1.10e-005 sq ft/sec
Chemical Diffusivity	1.30e-008 sq ft/sec
Vapor Pressure	8.40e-001 ft
Total Duration	0.00 hrs

Hydraulic Convergence at 00:00 hrs:
Trial 1 : 2.228774 accuracy
PRV 30028 switched from OPEN to ACTIVE
FCV 30062 switched from ACTIVE to OPEN
FCV 30084 switched from ACTIVE to OPEN
Trial 2 : 0.834236 accuracy
FCV 30084 switched from OPEN to ACTIVE
Pipe 190667 switched from OPEN to CLOSED
Pipe 190671 switched from OPEN to CLOSED
Trial 3 : 3.106798 accuracy
Trial 4 : 0.023514 accuracy
Trial 5 : 0.003253 accuracy

Hydraulic Status:

Balanced 5 trials (0.003253 accuracy) at 0.0022 gpm
Flow Supplied 20300.00 gpm
Flow Demanded 22303.25 gpm
Flow Stored -2004.24 gpm
Tank 20107 Closed (166.32 ft level)
Tank 20109 Emptying (120.12 ft level)
Tank 20111 Emptying (173.25 ft level)
Tank 20115 Closed (173.25 ft level)
Tank 20117 Closed (120.12 ft level)
Pipe 10538 Closed
CV 12076 Closed
CV 15809 Closed

CV	15878	Closed
CV	15920	Closed
CV	190323	Closed
Pipe	190675	Closed
Pipe	190699	Closed
Pipe	3151	Closed
CV	3175	Closed
CV	3312	Closed
Pump	50043	Closed (0.00 setting)
Pump	50045	Closed (0.00 setting)
Pump	50047	Closed (0.00 setting)
Pump	50049	Open (1.00 setting)
Pump	50051	Closed (0.00 setting)
Pump	50127	Open (1.00 setting)
Pump	50129	Open (1.00 setting)
Pump	50131	Open (1.00 setting)
PRV	30028	Active (75.00 psi setting)
PRV	30056	Closed
FCV	30062	Cannot deliver flow (1.00 gpm setting)
FCV	30064	Open
FCV	30082	Open
FCV	30084	Active (1.00 gpm setting)
FCV	30090	Open

* Warning: FCV 30062 - Cannot deliver flow at 00:00 hrs.

****
Warning/Error Messages during Run
****

** Retrieving Network Data **

** Simulating Network Hydraulics **
at time: 00:00
* Warning: FCV 30062 - Cannot deliver flow at 00:00 hrs.

Warnings exist. Please check Output Report for details

Proposed System - Average Day Demand - Tank Report

[redacted]	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
[redacted]	20107	0.00	22.91	189.23	72.10
[redacted]	20109	-2,003.24	61.50	181.62	52.07
[redacted]	20111	-1.00	61.13	234.38	75.10
[redacted]	20115	0.00	60.00	233.25	75.10
[redacted]	20117	0.00	60.00	180.12	52.07

Proposed System - Average Day Demand - Junction Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
1	17009	36.50	31.57	176.18	62.69
2	16996	0.00	31.01	176.18	62.93
3	17054	0.00	30.27	176.12	63.23
4	17048	0.00	30.25	176.15	63.25
5	17053	0.00	29.63	176.11	63.50
6	17049	0.00	29.57	176.11	63.52
7	17122	0.00	29.41	176.01	63.55
8	17011	0.00	29.90	176.60	63.59
9	17144	0.00	29.25	176.01	63.62
10	17074	0.00	29.02	176.62	63.98
11	17068	0.00	28.98	176.62	64.00
12	17304	0.00	26.52	175.99	64.80
13	17305	0.00	26.50	175.99	64.80
14	17307	0.00	26.47	175.99	64.82
15	17057	0.00	26.44	176.02	64.84
16	200004	36.50	26.20	175.99	64.93
17	17310	0.00	26.07	175.99	64.99
18	17321	0.00	26.07	175.99	64.99
19	17279	0.00	26.50	176.68	65.10
20	17281	1.40	26.50	176.68	65.10
21	17356	0.00	26.48	176.71	65.12
22	17408	0.00	25.20	175.97	65.36
23	17401	1.40	25.41	176.70	65.59
24	17407	1.40	25.33	176.70	65.62
25	17415	0.00	24.20	175.97	65.79
26	17424	1.40	24.84	176.70	65.83
27	17479	0.00	24.40	176.72	66.03
28	17434	1.40	24.27	176.70	66.08
29	17490	0.00	24.14	176.72	66.14
30	17406	0.00	24.13	176.73	66.15
31	17445	1.40	24.07	176.70	66.16
32	17457	1.40	23.90	176.70	66.24
33	17087	36.50	22.86	175.91	66.35
34	17412	0.00	23.12	176.73	66.59
35	200002	36.50	22.00	175.96	66.74
36	17491	0.00	22.08	176.70	67.03
37	17517	0.00	21.58	176.67	67.23
38	17544	0.00	19.27	176.66	68.23
39	17543	0.00	19.19	176.67	68.27
40	17559	0.00	16.85	176.65	69.28

Proposed System - Average Day Demand - Junction Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
41	17493	0.00	15.91	175.95	69.38
42	17560	0.00	16.49	176.65	69.43
43	17506	0.00	15.17	175.95	69.70
44	17624	0.00	13.00	176.60	70.92
45	17570	0.00	13.02	176.65	70.94
46	17770	3.41	11.95	175.95	71.09
47	17769	3.41	11.92	175.95	71.11
48	17635	0.00	12.00	176.60	71.36
49	17768	0.00	11.44	176.52	71.56
50	17832	0.00	11.36	176.45	71.57
51	17869	0.00	11.10	176.42	71.67
52	17875	0.00	11.07	176.42	71.68
53	17771	0.00	10.82	176.52	71.83
54	17820	39.91	9.87	175.91	71.98
55	17904	3.41	9.49	175.86	72.12
56	190744	0.00	9.50	175.87	72.12
57	17905	3.41	9.41	175.86	72.16
58	17908	3.41	9.33	175.86	72.19
59	17910	3.41	9.28	175.86	72.21
60	17913	3.41	9.25	175.86	72.23
61	17914	3.41	9.24	175.86	72.23
62	17492	0.00	10.01	176.69	72.25
63	17920	3.41	9.14	175.86	72.27
64	17928	3.41	9.05	175.86	72.31
65	190746	81.41	9.00	175.85	72.33
66	17810	3.41	8.99	175.92	72.36
67	17990	0.00	9.35	176.30	72.37
68	17988	0.00	9.00	176.30	72.52
69	17803	0.00	8.61	175.92	72.53
70	17930	0.00	9.00	176.35	72.54
71	17934	0.00	9.00	176.35	72.54
72	17991	0.00	8.70	176.28	72.65
73	17989	0.00	8.63	176.28	72.68
74	200006	36.50	8.00	175.91	72.79
75	17555	0.00	8.38	176.65	72.95
76	18042	0.00	7.51	176.21	73.13
77	18041	0.00	7.44	176.21	73.16
78	18279	0.00	6.74	175.92	73.34
79	18171	0.00	6.81	176.07	73.37
80	18170	0.00	6.80	176.07	73.38

Proposed System - Average Day Demand - Junction Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
81	18110	0.00	6.76	176.14	73.43
82	18122	0.00	6.74	176.13	73.43
83	18241	0.00	6.50	175.90	73.44
84	18254	0.00	6.50	175.92	73.45
85	18255	0.00	6.50	175.92	73.45
86	18256	0.00	6.50	175.92	73.45
87	18101	0.00	6.69	176.14	73.46
88	18238	0.00	6.52	175.99	73.46
89	18250	0.00	6.50	175.99	73.47
90	18099	3.41	6.58	176.13	73.50
91	17774	3.41	6.32	175.91	73.52
92	17776	3.41	6.31	175.91	73.52
93	18233	3.41	6.14	175.90	73.59
94	18083	3.41	6.01	175.82	73.61
95	17799	100.00	5.86	175.87	73.70
96	18081	3.41	5.51	175.82	73.83
97	18200	3.41	5.44	175.81	73.85
98	18197	3.41	5.16	175.81	73.97
99	17772	0.00	5.12	175.88	74.03
100	18214	0.00	4.97	175.80	74.06
101	17567	0.00	4.71	175.93	74.22
102	18253	0.00	4.45	175.68	74.23
103	18252	0.00	4.45	175.68	74.23
104	17573	0.00	4.70	175.93	74.23
105	17714	63.00	4.28	175.90	74.40
106	18240	0.00	3.90	175.68	74.47
107	200000	36.50	2.00	175.93	75.40
108	17461	0.00	2.46	176.70	75.53
109	190742	0.00	1.50	175.85	75.58
110	17687	0.00	1.54	175.91	75.59
111	17669	0.00	1.50	175.91	75.61
112	17682	36.50	1.46	175.91	75.62
113	17497	0.00	0.71	176.69	76.29
114	17452	0.00	-3.75	176.70	78.22
115	17577	0.00	-4.42	176.41	78.39
116	17580	0.00	-4.45	176.41	78.40

City of Huntington Beach Domestic Water System
Pacific City Development Hydraulic Modeling Analysis
Proposed System - Peak Hour Demand

Number of Pipes	18773
Number of Nodes	17463
Number of Tanks	5
Number of Pumps	8
Number of Valves	7
Headloss Formula	Hazen-Williams
Hydraulic Timestep	1.00 hrs
Hydraulic Accuracy	0.010000
Maximum Trials	100
Quality Analysis	None
Specific Gravity	1.00
Kinematic Viscosity	1.10e-005 sq ft/sec
Chemical Diffusivity	1.30e-008 sq ft/sec
Vapor Pressure	8.40e-001 ft
Total Duration	0.00 hrs

Hydraulic Convergence at 00:00 hrs:
Trial 1 : 1.582193 accuracy
PRV 30028 switched from OPEN to ACTIVE
FCV 30062 switched from ACTIVE to OPEN
FCV 30084 switched from ACTIVE to OPEN
Trial 2 : 0.725562 accuracy
FCV 30062 switched from OPEN to ACTIVE
FCV 30084 switched from OPEN to ACTIVE
Trial 3 : 1.755477 accuracy
Trial 4 : 0.013642 accuracy
Trial 5 : 0.001688 accuracy

Hydraulic Status:

Balanced	5 trials (0.001688 accuracy) at 0.0022 gpm
Flow Supplied	35646.00 gpm
Flow Demanded	55878.09 gpm
Flow Stored	-20233.09 gpm
Tank 20107	Emptying (166.32 ft level)
Tank 20109	Emptying (120.12 ft level)
Tank 20111	Emptying (173.25 ft level)
Tank 20115	Emptying (173.25 ft level)
Tank 20117	Emptying (120.12 ft level)
Pipe 10538	Closed
CV 12076	Closed
CV 15809	Closed
CV 15878	Closed

CV	15920	Closed
CV	190323	Closed
Pipe	190675	Closed
Pipe	3151	Closed
CV	3175	Closed
CV	3312	Closed
Pump	50043	Closed (0.00 setting)
Pump	50045	Closed (0.00 setting)
Pump	50047	Closed (0.00 setting)
Pump	50049	Open (1.00 setting)
Pump	50051	Closed (0.00 setting)
Pump	50127	Open (1.00 setting)
Pump	50129	Open (1.00 setting)
Pump	50131	Open (1.00 setting)
PRV	30028	Active (75.00 psi setting)
PRV	30056	Closed
FCV	30062	Active (1.00 gpm setting)
FCV	30064	Open
FCV	30082	Active (4500.00 gpm setting)
FCV	30084	Active (1.00 gpm setting)
FCV	30090	Open

Proposed System - Peak Hour Demand - Tank Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
[illegible]	2107	-879.56	22.91	189.23	72.10
[illegible]	2109	-14,851.53	61.50	181.62	52.07
[illegible]	2113	-1.00	61.13	234.38	75.10
[illegible]	2115	-1.00	60.00	233.25	75.10
[illegible]	2117	-4,500.00	60.00	180.12	52.07

Proposed System - Peak Hour Demand - Junction Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
1	17009	91.30	31.57	151.45	51.97
2	16996	0.00	31.01	151.45	52.21
3	17054	0.00	30.27	151.21	52.43
4	17048	0.00	30.25	151.33	52.49
5	17122	0.00	29.41	150.73	52.59
6	17144	0.00	29.25	150.73	52.66
7	17053	0.00	29.63	151.14	52.67
8	17049	0.00	29.57	151.14	52.70
9	17011	0.00	29.90	153.37	53.52
10	17304	0.00	26.52	150.66	53.81
11	17305	0.00	26.50	150.66	53.82
12	17307	0.00	26.47	150.66	53.83
13	17057	0.00	26.44	150.78	53.90
14	17077	0.00	29.02	153.46	53.94
15	200004	91.30	26.20	150.65	53.95
16	17068	0.00	28.98	153.46	53.96
17	17310	0.00	26.07	150.63	54.00
18	17321	0.00	26.07	150.63	54.00
19	17408	0.00	25.20	150.56	54.34
20	17415	0.00	24.20	150.56	54.78
21	17279	0.00	26.50	153.76	55.17
22	17281	3.49	26.50	153.76	55.17
23	17356	0.00	26.48	153.89	55.23
24	17087	91.30	22.86	150.33	55.26
25	17401	3.49	25.41	153.86	55.68
26	200002	91.30	22.00	150.49	55.70
27	17407	3.49	25.33	153.86	55.72
28	17424	3.49	24.84	153.85	55.93
29	17479	0.00	24.40	153.91	56.14
30	17434	3.49	24.27	153.83	56.17
31	17445	3.49	24.07	153.83	56.25
32	17490	0.00	24.14	153.91	56.26
33	17406	0.00	24.13	153.96	56.28
34	17457	3.49	23.90	153.83	56.33
35	17412	0.00	23.12	153.96	56.72
36	17491	0.00	22.08	153.83	57.11
37	17517	0.00	21.58	153.69	57.27
38	17544	0.00	19.27	153.69	58.27
39	17543	0.00	19.19	153.69	58.31
40	17493	0.00	15.91	150.48	58.34

Proposed System - Peak Hour Demand - Junction Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
41	17506	0.00	15.17	150.48	58.66
42	17559	0.00	16.85	153.65	59.30
43	17560	0.00	16.49	153.64	59.46
44	17770	8.51	11.95	150.47	60.05
45	17769	8.51	11.92	150.47	60.06
46	17624	0.00	13.00	153.43	60.87
47	17820	99.81	9.87	150.30	60.88
48	17904	8.51	9.49	150.11	60.96
49	17570	0.00	13.02	153.65	60.96
50	190744	0.00	9.50	150.15	60.97
51	17905	8.51	9.41	150.10	60.99
52	17908	8.51	9.33	150.11	61.03
53	17910	8.51	9.28	150.10	61.05
54	17913	8.51	9.25	150.10	61.06
55	17914	8.51	9.24	150.10	61.06
56	17920	8.51	9.14	150.10	61.11
57	17928	8.51	9.05	150.10	61.14
58	190746	203.51	9.00	150.08	61.16
59	17810	8.51	8.99	150.32	61.27
60	17832	0.00	11.36	152.75	61.29
61	17635	0.00	12.00	153.43	61.31
62	17869	0.00	11.10	152.63	61.35
63	17875	0.00	11.07	152.63	61.36
64	17768	0.00	11.44	153.04	61.38
65	17803	0.00	8.61	150.32	61.43
66	17771	0.00	10.82	153.04	61.65
67	200006	91.30	8.00	150.29	61.68
68	17990	0.00	9.35	152.08	61.87
69	17988	0.00	9.00	152.08	62.02
70	17934	0.00	9.00	152.30	62.12
71	17930	0.00	9.00	152.30	62.12
72	17991	0.00	8.70	152.00	62.12
73	17989	0.00	8.63	152.00	62.15
74	18279	0.00	6.74	150.46	62.30
75	17492	0.00	10.01	153.78	62.32
76	18241	0.00	6.50	150.36	62.37
77	18254	0.00	6.50	150.46	62.41
78	18255	0.00	6.50	150.46	62.41
79	18256	0.00	6.50	150.46	62.41
80	17774	8.51	6.32	150.29	62.41

Proposed System - Peak Hour Demand - Junction Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
81	17776	8.51	6.31	150.29	62.42
82	18083	8.51	6.01	149.99	62.42
83	18042	0.00	7.51	151.69	62.50
84	18238	0.00	6.52	150.74	62.52
85	18233	8.51	6.14	150.36	62.52
86	18250	0.00	6.50	150.74	62.53
87	18041	0.00	7.44	151.69	62.53
88	18171	0.00	6.81	151.09	62.54
89	18170	0.00	6.80	151.09	62.55
90	17799	250.00	5.86	150.16	62.55
91	18081	8.51	5.51	149.99	62.63
92	18200	8.51	5.44	149.95	62.64
93	18122	0.00	6.74	151.37	62.70
94	18110	0.00	6.76	151.39	62.70
95	18101	0.00	6.69	151.39	62.73
96	18197	8.51	5.16	149.95	62.76
97	18099	8.51	6.58	151.37	62.77
98	18214	0.00	4.97	149.94	62.85
99	17772	0.00	5.12	150.19	62.89
100	18253	0.00	4.45	149.56	62.91
101	18252	0.00	4.45	149.57	62.91
102	17555	0.00	8.38	153.64	62.97
103	18240	0.00	3.90	149.57	63.15
104	17567	0.00	4.71	150.40	63.16
105	17573	0.00	4.70	150.40	63.16
106	17714	158.00	4.28	150.24	63.27
107	200000	91.30	2.00	150.38	64.32
108	190742	0.00	1.50	150.06	64.40
109	17687	0.00	1.54	150.28	64.48
110	17669	0.00	1.50	150.29	64.50
111	17682	91.30	1.46	150.28	64.51
112	17461	0.00	2.46	153.83	65.62
113	17497	0.00	0.71	153.78	66.36
114	17577	0.00	-4.42	152.56	68.05
115	17580	0.00	-4.45	152.56	68.06
116	17452	0.00	-3.75	153.83	68.31

City of Huntington Beach Domestic Water System
Pacific City Development Hydraulic Modeling Analysis
Proposed System - Maximum Day Demand w/ 4,000 gpm Fire Flow

Number of Pipes	18773
Number of Nodes	17463
Number of Tanks	5
Number of Pumps	8
Number of Valves	7
Headloss Formula	Hazen-Williams
Hydraulic Timestep	1.00 hrs
Hydraulic Accuracy	0.010000
Maximum Trials	100
Quality Analysis	None
Specific Gravity	1.00
Kinematic Viscosity	1.10e-005 sq ft/sec
Chemical Diffusivity	1.30e-008 sq ft/sec
Vapor Pressure	8.40e-001 ft
Total Duration	0.00 hrs

Hydraulic Convergence at 00:00 hrs:
Trial 1 : 1.432415 accuracy
PRV 30028 switched from OPEN to ACTIVE
FCV 30062 switched from ACTIVE to OPEN
FCV 30082 switched from ACTIVE to OPEN
FCV 30084 switched from ACTIVE to OPEN
FCV 30090 switched from ACTIVE to OPEN
Trial 2 : 0.846781 accuracy
FCV 30062 switched from OPEN to ACTIVE
FCV 30084 switched from OPEN to ACTIVE
Pipe 190671 switched from OPEN to CLOSED
Trial 3 : 1.878137 accuracy
Trial 4 : 0.023045 accuracy
Trial 5 : 0.002598 accuracy

Hydraulic Status:

Balanced 5 trials (0.002598 accuracy) at 0.0022 gpm
Flow Supplied 28400.00 gpm
Flow Demanded 39584.43 gpm
Flow Stored -11185.43 gpm
Tank 20107 Closed (166.32 ft level)
Tank 20109 Emptying (120.12 ft level)
Tank 20111 Emptying (173.25 ft level)
Tank 20115 Emptying (173.25 ft level)
Tank 20117 Closed (120.12 ft level)
Pipe 10538 Closed

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   CV   12076                    Closed
   CV   15809                    Closed
   CV   15878                    Closed
   CV   15920                    Closed
   CV   190323                   Closed
   Pipe 190675                   Closed
   Pipe 190699                   Closed
   Pipe 3151                     Closed
   CV   3175                     Closed
   CV   3312                     Closed
   Pump 50043                    Closed (0.00 setting)
   Pump 50045                    Closed (0.00 setting)
   Pump 50047                    Closed (0.00 setting)
   Pump 50049                    Open   (1.00 setting)
   Pump 50051                    Closed (0.00 setting)
   Pump 50127                    Open   (1.00 setting)
   Pump 50129                    Open   (1.00 setting)
   Pump 50131                    Open   (1.00 setting)
   PRV  30028                    Active (75.00 psi setting)
   PRV  30056                    Closed
   FCV  30062                    Active (1.00 gpm setting)
   FCV  30064                    Open
   FCV  30082                    Cannot deliver flow (1700.00 gpm setting)
   FCV  30084                    Active (1.00 gpm setting)
   FCV  30090                    Cannot deliver flow (10000.00 gpm setting
)

   * Warning: FCV  30082 - Cannot deliver flow at 00:00 hrs.
   * Warning: FCV  30090 - Cannot deliver flow at 00:00 hrs.


  ****************************************
     Warning/Error Messages during Run
  ****************************************


** Retrieving Network Data **

** Simulating Network Hydraulics **
at time:  00:00
* Warning: FCV  30082 - Cannot deliver flow at 00:00 hrs.
* Warning: FCV  30090 - Cannot deliver flow at 00:00 hrs.

Warnings exist.  Please check Output Report for details
```

Proposed System - Max. Day Demand w/ Fire Flow - Tank Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
1	2010	0.00	22.91	189.23	72.10
2	2009	-11,183.43	61.50	181.62	52.07
3	2011	-1.00	61.13	234.38	75.10
4	2015	-1.00	60.00	233.25	75.10
5	2017	0.00	60.00	180.12	52.07

Proposed System - Max. Day Demand w/ Fire Flow - Junction Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
1	17122	0.00	29.41	142.72	49.12
2	17144	0.00	29.25	142.72	49.19
3	200002	58.40	22.00	137.95	50.27
4	17304	0.00	26.52	142.60	50.32
5	17305	0.00	26.50	142.60	50.33
6	17307	0.00	26.47	142.60	50.34
7	17009	58.40	31.57	147.79	50.38
8	200004	58.40	26.20	142.59	50.46
9	17310	0.00	26.07	142.59	50.51
10	17321	0.00	26.07	142.59	50.51
11	16996	0.00	31.01	147.79	50.63
12	17408	0.00	25.20	142.57	50.88
13	17054	0.00	30.27	148.04	51.05
14	17048	0.00	30.25	148.17	51.12
15	17053	0.00	29.63	147.91	51.27
16	17049	0.00	29.57	147.91	51.30
17	17415	0.00	24.20	142.57	51.31
18	17057	0.00	26.44	147.18	52.34
19	17011	0.00	29.90	150.65	52.35
20	17077	0.00	29.02	150.98	52.87
21	17068	0.00	28.98	150.98	52.89
22	17087	58.40	22.86	146.24	53.48
23	17281	2.24	26.50	152.07	54.44
24	17279	0.00	26.50	152.07	54.44
25	17356	0.00	26.48	152.54	54.65
26	17493	0.00	15.91	142.55	54.90
27	17401	2.24	25.41	152.47	55.08
28	17407	2.24	25.33	152.47	55.12
29	17506	0.00	15.17	142.55	55.22
30	17424	2.24	24.84	152.44	55.31
31	17434	2.24	24.27	152.40	55.55
32	17479	0.00	24.40	152.67	55.60
33	17445	2.24	24.07	152.40	55.63
34	17457	2.24	23.90	152.40	55.70
35	17490	0.00	24.14	152.67	55.72
36	17406	0.00	24.13	152.80	55.78
37	17770	5.45	11.95	141.21	56.03
38	17769	5.45	11.92	141.21	56.05
39	17412	0.00	23.12	152.80	56.22
40	200000	4,058.40	2.00	132.38	56.52

Proposed System - Max. Day Demand w/ Fire Flow - Junction Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
41	17491	0.00	22.08	152.47	56.53
42	17517	0.00	21.58	152.16	56.61
43	17820	63.85	9.87	140.56	56.66
44	17810	5.45	8.99	140.66	57.08
45	17803	0.00	8.61	140.66	57.24
46	17544	0.00	19.27	152.15	57.61
47	190744	0.00	9.50	142.43	57.62
48	17543	0.00	19.19	152.16	57.64
49	17904	5.45	9.49	142.46	57.64
50	17905	5.45	9.41	142.47	57.68
51	17908	5.45	9.33	142.46	57.71
52	17910	5.45	9.28	142.48	57.74
53	17914	5.45	9.24	142.47	57.75
54	17913	5.45	9.25	142.48	57.76
55	17920	5.45	9.14	142.48	57.80
56	17928	5.45	9.05	142.48	57.84
57	190746	130.45	9.00	142.57	57.90
58	17776	5.45	6.31	141.17	58.46
59	17774	5.45	6.32	141.19	58.46
60	17559	0.00	16.85	152.05	58.61
61	17560	0.00	16.49	152.05	58.76
62	200006	58.40	8.00	144.42	59.14
63	17799	160.00	5.86	142.50	59.23
64	18083	5.45	6.01	143.11	59.43
65	17772	0.00	5.12	142.49	59.55
66	18081	5.45	5.51	143.11	59.65
67	18200	5.45	5.44	143.20	59.72
68	18279	0.00	6.74	144.53	59.73
69	18241	0.00	6.50	144.30	59.74
70	17567	0.00	4.71	142.53	59.74
71	17573	0.00	4.70	142.53	59.75
72	18256	0.00	6.50	144.53	59.84
73	18255	0.00	6.50	144.53	59.84
74	18254	0.00	6.50	144.53	59.84
75	18197	5.45	5.16	143.20	59.84
76	18233	5.45	6.14	144.30	59.89
77	17714	100.00	4.28	142.49	59.92
78	18214	0.00	4.97	143.21	59.93
79	17624	0.00	13.00	151.54	60.06
80	17869	0.00	11.10	149.69	60.08

Proposed System - Max. Day Demand w/ Fire Flow - Junction Report

	ID	Demand (gpm)	Elevation (ft)	Grade (ft)	Pressure (psi)
81	17875	0.00	11.07	149.69	60.09
82	17832	0.00	11.36	149.98	60.09
83	18238	0.00	6.52	145.21	60.12
84	18250	0.00	6.50	145.21	60.13
85	18252	0.00	4.45	143.41	60.24
86	18253	0.00	4.45	143.42	60.24
87	17570	0.00	13.02	152.05	60.27
88	17990	0.00	9.35	148.41	60.28
89	17768	0.00	11.44	150.64	60.34
90	18171	0.00	6.81	146.07	60.37
91	18170	0.00	6.80	146.07	60.37
92	17988	0.00	9.00	148.41	60.44
93	18240	0.00	3.90	143.41	60.48
94	17991	0.00	8.70	148.24	60.49
95	17635	0.00	12.00	151.54	60.49
96	17989	0.00	8.63	148.24	60.52
97	17771	0.00	10.82	150.64	60.61
98	17934	0.00	9.00	148.93	60.66
99	17930	0.00	9.00	148.93	60.66
100	18042	0.00	7.51	147.51	60.69
101	18122	0.00	6.74	146.77	60.70
102	18110	0.00	6.76	146.82	60.72
103	18041	0.00	7.44	147.51	60.72
104	18101	0.00	6.69	146.82	60.75
105	18099	5.45	6.58	146.76	60.77
106	17687	0.00	1.54	142.47	61.09
107	17669	0.00	1.50	142.50	61.12
108	17682	58.40	1.46	142.49	61.14
109	190742	0.00	1.50	142.66	61.19
110	17492	0.00	10.01	152.37	61.71
111	17555	0.00	8.38	152.05	62.28
112	17461	0.00	2.46	152.47	65.03
113	17497	0.00	0.71	152.37	65.74
114	17577	0.00	-4.42	148.16	66.14
115	17580	0.00	-4.45	148.16	66.16
116	17452	0.00	-3.75	152.47	67.72

M E M O R A N D U M

DATE: November 27, 2002

TO: Mary Beth Broeren, Senior Planner
CITY OF HUNTINGTON BEACH

FROM: James H. Smith, P.E.
HUNSAKER & ASSOCIATES IRVINE, INC.

RE: **Response to Comments from City of Huntington Beach "Pacific City Offsite/Onsite Water/Sewer Analysis & Water Supply Assessment".**

The following is our response to comments from the City of Hunting Beach "Domestic Water and Sanitary Sewer CEQA Support Information for Pacific City". Our responses are listed in bold under each comment.

SEPTEMBER 26, 2002 INTERDEPARTMENTAL COMMUNICATIONS

WATER SUPPLY ASSESSMENT

1. Paragraph 2 on page 4 states the "present land use is for oil production". This operation has been discontinued and the site has been undergoing remediation. The paragraph should be revised to reflect oil production as a previous land use, and identify the existing use as vacant with the land use designation currently shown in the general plan. This paragraph also needs to explain how the project was anticipated in the City's water assessment study.

   Paragraph 2, Page 4 has been revised to better reflect history of property and how City anticipated the Pacific City project in water assessment study.

2. The facilities described on page four need to be identified as existing, proposed by the development and proposed by the city or currently under construction by the city. The associated facilities map in the Appendix should also show these designations. The facilities map also needs to show the facilities being constructed by the city, and the reach to Beach Blvd.

   The City staff has deleted this remark as referenced graphic shows all water lines to be constructed as a result of the Pacific City project.

3. On page 7 of the study, reference is made to "newspaper clips, treatises, articles and miscellaneous oral and written reports presented during conferences and elsewhere". I could not find any of these documents or references in the study. Additionally, recent news articles in local papers have drawn attention to overdraft of the basin by the OCWD and concerns have been raised about addressing this problem. However, nowhere is this

addressed in the Water Supply Assessment. This issue needs to be addressed in the report to complete the analysis.

All references to "newspaper clips, treatises, articles and miscellaneous oral & written reports" have been deleted. Newspaper articles are commonly in error and represent the slant of the writer rather than fact.

SANITARY SEWER ANALYSIS

4. The Sanitary Sewer System Analysis is not acceptable. Although it does identify estimated flows from the project, there is no analysis to quantify the proposed facilities as adequate by sizing or gradient on a preliminary basis. There need to be an estimate of flows for each reach of the system to satisfy this requirement to substantiate the proposed line sizing. Additionally, a comparison should be made between existing flows in the County system and the flows being added by this project so that a finding of "insignificant impact" can be made.

The Orange County Sanitation District has revised their letter, now dated October 30, 2002, to show estimated trunk sewer capacity, existing sewer flows and impact of Pacific City flows on trunk sewer system.

A preliminary sewer system design is presented with the engineering analysis, showing preliminary sewer elevations, pipe sizes, pipe slopes, estimated sewer flows, and estimated D/d ratios by sewer reach

5. The first paragraph of page 6 is not correct in concept. The connection to the existing 54-inch line at Walnut and First will be made to a City facility. Per the letter from the District, the actual connection to the County facility is made by the City as applicant. The construction of the connection is paid for by the developer. This paragraph needs to be revised to reflect correctly how the connection to the County facility will be handled. Also not covered in the analysis is the requirement for grease traps in restaurant systems to address water quality concerns. The location of the facilities for maintenance access also needs to be addressed.

1. Sewer connection description has been revised.

2. Grease traps are referenced on Sewer Line Exhibit.

6. To supplement the findings of the analysis, the applicant will need to submit final design hydraulics, sizing analysis, phasing (if necessary for interim conditions), proposals for installation of grease trap facilities with sizing calculations with final improvement plans for the onsite and offsite systems.

A full set of engineering design calculations will be submitted when final plans are submitted to the City for approval.

OCTOBER 2, 2002 INTERDEPARTMENTAL COMMUNICATIONS

1. The last paragraph of page 4 should be revised. A suggestion revision could be : *"The City's Public Works Department contracted with Tetra Tech, Inc. to perform a computer model hydraulic analysis of water service to the PACIFIC CITY project site and the surrounding area, based on City planning data, and data provided by Makar Properties. The analysis noted various water distribution system deficiencies resulting from the proposed project, that will require mitigation (in the form of infrastructure improvements), to meet the demands of , and for the benefit of the proposed project and the surrounding area. The proposed improvements are shown on the map in the Appendix....."*

   Suggested wording for hydraulic analysis preparation inserted in WSA.

2. It is suggested that a boundary line be added to Exhibit #1 of the WSA, (location between pages 4 and 5), to define the project limits.

   Approximate project boundaries shown in Exhibit 1.

3. Last sentence on WSA page 5: the words "realignments are inter-ties" should be replaced with the word "improvements."

   WSA wording describing "improvements" substituted in WSA.

4. Tables 1 and 2 on page 6 of the WSA are not consistent with the actual demands utilized in the TT-HA. For example, WSA Table 1 indicates a maximum day demand of 709 gpm; the TT-HA indicates 467 gpm. WSA Table 1 indicates a peak hour demand of 917 gpm; the whereas the TT-HA uses a peak hour demand of 730 gpm. (See page 2, TT-HA) This is because the peaking factors indicated in the WSA are out of date, as we indicated in our previous comments concerning the WSA. These discrepancies will not effect the conclusions of either report, however, in the interest of accuracy; the WSA should be revised as necessary to be consistent with the TT-HA.

   Water demands were changed to match Tetra-Tech report.

5. WSA Table 5, page 9 shows population projections that we noted as "questionable" in our previous review. This WSA does not address this comment. We request that there be some discussion of the City's endorsement of these figures, if applicable. A decrease in population projections from 2010-2020 as shown, could be significant.

   We discuss population decrease from 2010 to 2020 in WSA.

6. The first sentence on page 15 reads: "The City of Huntington Beach has an adequate supply of water to serve both the projected and existed customers of the City." We suggest that this sentence should be replaced with the following: "The City of Huntington Beach can provide adequate water supply for the proposed development with planned system improvements, in accordance with the adopted Water Master Plan. Similarly, with supplies under development, Metropolitan Water District can reliably meet projected supplemental demands beyond the next 20 years."

Suggested wording used in WSA.

7. Page 24, code section 66473.7© formerly indicated WSA status "satisfied", and now reads, "To Be Satisfied." Please Explain.

"To Be Satisfied" means City action required.

8. Page 24, code section 66473.7(d) formerly indicated WSA status "satisfied", and now reads, "To Be Satisfied." Please Explain.

The above paragraph refers to a private water system and the City's water system is public so the correct answer is "N/A" (Not Applicable).

JS:wp
xc: Jim Smith, H&A
W.O. 2198-13X
(f\c\wo\2198\13 M09-js.doc)

CITY OF HUNTINGTON BEACH

INTERDEPARTMENTAL COMMUNICATION

TO: Mary Beth Broeren, Principal Planner

FROM: Terri Elliott, Principal Engineer

RECEIVED
OCT 02 2002

DATE: October 2, 2002

SUBJECT: Pacific City Water Supply Assessment

The following comments for the Water Supply Assessment needs to be incorporated into the previously sent memo dated September 26, 2002.

The WSA is generally in conformance with the approved Hydraulic Analysis for this project, which was submitted by Tetra Tech, Inc., dated July 29,2002, herein referenced as TT-HA.

From a technical standpoint, the subject WSA will sufficiently address the requirements of SB221 and SB610. If a legal review is necessary, that is obviously beyond the scope of our review. Our review comments for the subject Water Supply Assessment are relatively minor, and include the following:

1. The last paragraph of page 4 should be revised. A suggested revision could be: *"The City's Public Works Department contracted with Tetra Tech, Inc. to perform a computer model hydraulic analysis of water service to the PACIFIC CITY project site and the surrounding area, based on City planning data, and data provided by Makar Properties. The analysis noted various water distribution system deficiencies resulting from the proposed project, that will require mitigation (in the form of infrastructure improvements), to meet the demands of, and for the benefit of the proposed project and the surrounding area. The proposed improvements are shown on the map in the Appendix....."*
2. It is suggested that a boundary line be added to Exhibit #1 of the WSA, (located between pages 4 and 5), to define the project limits.
3. Last sentence on WSA page 5: the words "realignments and inter-ties" should be replaced with the word "improvements".
4. Tables 1 and 2 on page 6 of the WSA are not consistent with the actual demands utilized in the TT-HA. For example, WSA Table 1 indicates a maximum day demand of 709 gpm; the TT-HA indicates 467 gpm. WSA Table 1 indicates a peak hour demand of 917 gpm, whereas the TT-HA uses a peak hour demand of 730 gpm. (See page 2 , TT-HA.) This is because the peaking factors indicated in the WSA are out of date, as we indicated in our previous comments concerning the WSA. These discrepancies will not effect the conclusions of either report, however, in the interest of accuracy; the WSA should be revised as necessary to be consistent with the TT-HA.
5. WSA Table 5, page 9 shows population projections that we noted as "questionable" in our previous review. This WSA does not address this comment. We request that there be some discussion of the City's endorsement of these figures, if applicable. A decrease in population projections from 2010-2020 as shown, could be significant.

6. The first sentence on page 15 reads: "The City of Huntington Beach has an adequate supply of water to serve both the projected and existing customers of the City." WE suggest that this sentence should be replaced with the following:
"The City of Huntington Beach can provide adequate water supply for the proposed development, with planned system improvements, in accordance with the adopted Water Master Plan. Similarly, with supplies under development, Metropolitan Water District can reliably meet projected supplemental demands beyond the next 20 years."
7. Page 24, code section 66473.7(c) formerly indicated WSA status "Satisfied", and now reads, "To Be Satisfied." Please explain.
8. Page 24, code section 66473.7 (d) formerly indicated WSA status "Satisfied", and now reads, "To Be Satisfied." Please explain.

CITY OF HUNTINGTON BEACH

INTERDEPARTMENTAL COMMUNICATION

TO: Mary Beth Broeren, Principal Planner

FROM: Terri Elliott, Civil Engineer Principal
Robert Righetti, Project Review

RECEIVED
SEP 27 2002

SUBJECT: **Pacific City – Offsite/Onsite Water/Sewer Analysis**

DATE: September 26, 2002

We have completed our review of the Overall Offsite/Onsite Water/Sewer analysis for the Pacific City (31 Acres) development and find that the Water System Analysis is satisfactory for a general evaluation of the mitigation requirements for the project. We would recommend, however, that the systems exhibit be revised to match the one revised and used for the Water Supply Assessment. As for the other two reports, some revisions are required for the Water Supply Assessment report and the Sanitary Sewer System Analysis.

Water Supply Assessment

Paragraph 2 on page 4 states the "present land use is for oil production." This operation has been discontinued and the site has been undergoing remediation. The paragraph should be revised to reflect oil production as a previous land use, and identify the existing use as vacant with the land use designation currently shown in the general plan. This paragraph also needs to explain how the project was anticipated in the City's water assessment study.

The facilities described on page four need to be identified as existing, proposed by the development and proposed by the city or currently under construction by the city. The associated facilities map in the Appendix should also show these designations. The facilities map also needs to show the facilities being constructed by the city, and the reach to Beach Blvd.

On page 7 of the study, reference is made to "newspaper clips, treatises, articles and miscellaneous oral and written reports presented during conferences and elsewhere." I could not find any of these documents or references in the study. Additionally, recent news articles in local papers have drawn attention to overdraft of the basin by the OCWD and concerns have been raised about addressing this problem. However, nowhere is this addressed in the Water Supply Assessment. This issue needs to be addressed in the report to complete the analysis.

Sanitary Sewer System Analysis

The Sanitary Sewer System Analysis is not acceptable . Although it does identify estimated flows from the project, there is no analysis to quantify the proposed facilities as adequate by sizing or gradient on a preliminary basis. There needs to be an estimate of flows for each reach of the system to satisfy this requirement to substantiate the proposed line sizing. Additionally, a comparison should be made between existing flows in the County system and the flows being added by this project so that a finding of "insignificant impact" can be made.

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connection is paid for by the developer. This paragraph needs to be revised to reflect correctly how the connection to the County facility will be handled.
Also not covered in the analysis is the requirement for grease traps in restaurant systems to address water quality concerns. The location of the facilities for maintenance access also needs to be addressed.

To supplement the findings of the analysis, the applicant will need to submit final design hydraulics, sizing analysis, phasing (if necessary for interim conditions), proposals for installation of grease trap facilities with sizing calculations with final improvement plans for the onsite and offsite systems.

If you have any questions about the submitted study or the project design requirements, please feel free to contact me at 374-1731.

cc: file
David Webb, City Engineer
Tom Rulla, Principal Civil Engineer
Debbie De Bow, Associate Civil Engineer
Lili Tom, Civil Engineer Assistant

ORANGE COUNTY SANITATION DISTRICT

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October 30, 2002

Bob Righetti
City of Huntington Beach
Department of Public Works
2000 Main Street
P.O. Box 190
Huntington Beach, CA 92648

Subject: Capacity for Proposed Connection to Existing 54-Inch Coast Trunk Sewer

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This letter is to provide additional information regarding flow capacity in the Orange County Sanitation District's (District) 54-inch diameter Coast Trunk Sewer to serve the proposed 31-acre development by Makar Properties LLC., located between Atlanta Avenue, Huntington Street, Pacific Coast Highway (PCH) and First Street in the City of Huntington Beach.

Information provided by Hunsaker Associates indicates that the estimated peak sewer flow from the development is 0.472 mgd. The District's master plan estimates that the peak wet weather flow in the Coast Trunk Sewer is 6.6 mgd compared to the peak sewer capacity of 44 mgd. These projections indicate that there will be more than 30 mgd of unused peak capacity through the year 2020. This excess capacity is more than sufficient to handle the proposed development that is projected to generate peak sewage flows of less than 1 mgd.

If you have any additional questions, please contact Jim Herberg, Planning Manager at 714-593-7310.

David A. Ludwin, P.E.
Director of Engineering

DAL:JDH:sa
C:\FileNetWIP\makar coast trunk capacity letter.doc

C: Jim Smith, Hunsaker Associates